SCIENTIFIC BOOKS
IN HIGHLIGHT

POLITEHNICA UNIVERSITY TIMISOARA
1989-2019

Daniel Dejica-Carțiș (ed.)

Editura POLITEHNICA

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Colecția “MONOGRAFII”

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Editor: Daniel Dejica-Carțiș

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Message from the Rector

In 2018 we celebrated the Centenary of Romania, in 2019 the Centenary of Banat, and in 2020 we celebrate the Centenary of the Timișoara Polytechnic. It is interesting how history sometimes fits things in and ties them together. In the same way in which the Banatians' desire to have a higher education institute would not have been possible in the absence of the Great Union, the Polytechnic School could not have been created without the union of the Banat region with the Motherland. The emulation that led to the establishment of the Polytechnic School by the royal decree signed by His Majesty King Ferdinand on November 11, 1920, raised Timișoara to the rank of Civitas Academica. In return, Politehnica, in its own mission, has contributed in an exemplary way to the economic, social and cultural development of Timișoara, Banat, Romania and even beyond these borders.

If at the beginning - as the Rector of the time, Victor Vâlcovici, would declare at the institution's 10th anniversary - "Politehnica was like a new born baby ... almost everything was missing", now, the Politehnica University Timișoara, the oldest institution of higher education in the western part of Romania, is included in the category of the most valuable institutions of higher education in the country, that of universities of advanced research and education.

Today, we are proud that more than 130,000 graduates have carried on the spirit of the Polytechnic and have had a remarkable contribution to the economic development of Romania and beyond, the quality of the engineers trained in Timișoara being a respected and appreciated business card anywhere in world.

In addition, the Polytechnic School of Timișoara is recognized as a powerful center for research, technological transfer and innovation. The excellent results materialized by the hundreds of grants and scientific contracts obtained in various fields of advanced and applied research, the internationalization of the research activity by participating in research networks or consortia, the increased degree of valorisation of the research results carried out by publishing in prestigious ISI journals, are undeniable examples of the activity of excellence carried out here.

The reputation that our university enjoys in this area is also highlighted by the position on the leading places in international rankings (for example, SCImago Rankings 2018 place us in the third position at national level, and in the 47th place among more than 3,000 universities in Central Europe).

The present editorial project, dedicated to the Centenary of our university, supports the aforementioned by reflecting the results of the scientific activities of the teaching staff, published in monographs or specialized volumes at prestigious publishers from abroad, the Publishing House of the Romanian Academy or the Technical Publishing House in the last 30 years.

I am convinced that the 100 books summarized in this monograph, in addition to the recognition of their authors, will also contribute to strengthening the prestige of the institution at international level and will facilitate the internationalization of scientific research and cooperation by establishing new links or strengthening existing ones with universities and research institutes around the world.

Prof. univ. dr. eng. Viorel-Aurel Şerban,
Rector of the Politehnica University Timișoara

SCIENTIFIC
BOOKS
IN HIGHLIGHT

A Message from the Editor: Celebrating Academic Excellence.

The edited volume ***Politehnica University Timișoara, 1989-2019: 100 Scientific Books in Highlight*** *is part of an extensive editorial project and book series aimed at celebrating the 100th anniversary of our institution. It includes a part of the books published by the members of the Politehnica academic community at international publishing houses or in Romania, at Editura Academiei Române [The Publishing House of the Romanian Academy] and Editura Tehnică [Technical Publishing House] in the above-mentioned period.*

A centennial offers a good reason to analyze the past and look into the future. In particular, such an editorial project highlights multiple results and puts forward several objectives: the monograph reconfirms our status of advanced research and education university, reflects the research interests of the teachers in the various scientific branches of our university, can be a valuable source of reference for teachers but also for the students enrolled in the university master's or PhD programs, may stimulate further research activities and publication projects by the younger generation, and last but not least, can be act like a genuine business card for our colleagues from the universities in Romania and abroad, increasing thus the collaboration opportunities the degree of visibility and internationalization of our institution.

Editing such a monograph was a challenging endeavour, given the diversity of scientific interests of the colleagues from the research centers or departments of the university, and the different time intervals when these scientific research results were materialized by the publication of the books. The major criterion underlying the arrangement of the books in the monograph was the existing classification in the Nomenclature of the fields and specializations / programs of university studies. Within the same branch of science, the arrangement was made chronologically.

The books were thus grouped under four major fundamental domains, including engineering sciences, mathematics and natural sciences, social sciences, humanities and arts. These domains were subsequently grouped under the various existing branches of science at our university.

Engineering sciences, the largest book section, includes 77 contributions grouped under four branches of science: civil engineering; electrical engineering, electronics and telecommunications; systems engineering, computers and information technology; and mechanical engineering, mechatronics, industrial engineering.

The remaining 23 contributions are shared by mathematics and natural sciences, social sciences, humanities and the arts. Accordingly, the 7 contributions included in the mathematics and natural sciences section are shared by mathematics (2) and chemistry (5); the social sciences section includes 5 contributions in the fields of administrative sciences and economics; and last but not least, 11 contributions are included in the humanities and arts section, of which, philology (10) and architecture (1).

12 out of the 100 contributions were published in Romania by Editura Academiei Române (6) and by Editura Tehnică (6). The majority of the books published abroad include those published by prestigious publishing houses such as Springer (16) or Elsevier (5), and also by many other famous publishing houses such as Cambridge Scholars Publishing, CRC Press, DeGruyter, Imperial College Press, Kluwer Academic Publishers, Royal Society of Chemistry or Taylor & Francis, to name just a few. Out of the 100 contributions, 75 are authored or edited books, while 25 are book chapters signed by our colleagues and included in collective volumes edited by international authors.

In a nutshell, this edited monograph is intended to celebrate academic excellence and to thank all authors who contributed to the prestige, visibility and internationalization of our institution. However, it is worthwhile mentioning that there are many other monographs or edited volumes published by our colleagues in Romania or abroad, just as valuable as the ones included in this edited volume, which due to objective reasons were not included in this edition of the monograph, and which, with joined efforts, should be included in a future edition or in other similar monographs.

***Daniel Dejica-Carțiș**, Editor*
Professor and Dean of the Faculty of Communication Sciences
Politehnica University Timișoara

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

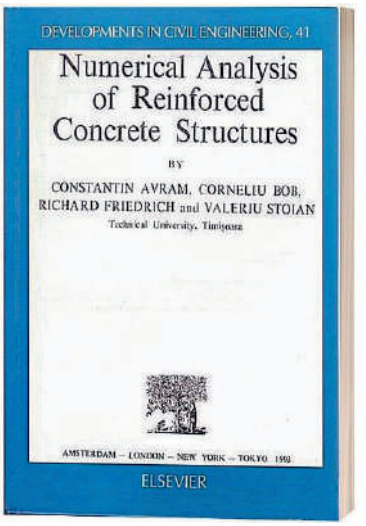
1. 1. CIVIL ENGINEERING
1.1.1. CIVIL ENGINEERING AND INSTALLATIONS

1 NUMERICAL ANALYSIS OF REINFORCED CONCRETE STRUCTURES

(1993)

CONSTANTIN AVRAM, CORNELIU BOB,
RICHARD FRIEDRICH, VALERIU STOIAN

Elsevier, Amsterdam
ISBN 0-444-98842-4



Short description of the book

Concrete has achieved an unprecedented position in modern civil engineering. Its ideal properties, of turning from a true plastic paste into a rock-like mass, allow the designer a wide diversity of shapes in applications.

This book describes the use of modern numerical methods in the static, dynamic and stability analyses of reinforced structures of one, two and three dimensions. Numerical methods were introduced in the design process around the mid-1950s and have recently made unprecedented progress and have been applied more widely than any other analysis method.

The theory presented in the book combines comprehensive results from the up-to-date literature and from the authors' own experience.

The shown applications include a large number of numerical examples and the data presented in the Annexes can be immediately used by any specialist in numerical analysis method and computation.

The book is intended for research and design workers, civil engineers, teachers, and students as well as for all the people interested in the use of numerical methods.

As far as the Romanian edition is concerned, this revised and updated English version additionally deals with the boundary element method and with the probabilistic finite-element analysis of structures. Additional numerical examples are also presented.

Book summary

Concrete may be adapted to the most diverse technological procedures and plain, reinforced, and pre-stressed combinations are widely used today. The three main criteria in the present-day engineering design are strength, durability, and low cost as means to obtain a sustainability structure. Practice has shown that reinforced concrete can best satisfy these criteria as well as the ability to resist fire and to have a good rigidity for seismic actions. It is therefore understandable why reinforced concrete will continue to be the mainstay of construction everywhere, today and in the foreseeable future. After Chapter 1 – Introduction, the general principles of the finite-element methods and the theory of equivalences are presented in Chapter 2. Chapter 3 deals with frameworks, Chapter 4 focuses on plates, Chapter 5 discusses shells and Chapter 6 revolves around massive structures. The static analysis of stability, the nonlinear analysis and the dynamics are treated for each structural type. A large number of numerical examples illustrate the theory discussed herein. The two annexes present the basic concepts (variational principles, matrix algebra, interpolation and integration and statistical evaluation of structural characteristics – Annex A, and characteristic matrices – Annex B).

2

SEMINAR ON EUROCODE-2. DESIGN OF CONCRETE STRUCTURES

(1994)

CORNELIU BOB, IOANNIS VAYAS (EDS.)
Klidarithmos, Athens, Greece

Short description of the book

The present Volume contains the papers that were presented at a Seminar on Eurocode-2 "Design of Concrete Structures" which was organised by the Department of Civil Engineering of the Technical University of Timisoara as a continuous educational activity within a TEMPUS Joint European Project 4502/93/2 funded by the European Community. The papers were presented by 20 authors who were staff members of the Technical Universities of Timisoara, Cluj-Napoca, Iasi, The Building Research Institute – INCERC Bucharest, the Structural Engineering Association – AICPS Timisoara, the Sheffield Hallam University UK and the National Technical University of Athens, Greece.

The Seminar was attended by more than 100 participants from different technical universities, enterprises, and research institutions.

This volume intends to make Eurocode-2 familiar to a wider circle of engineers than to the participants.

The Seminar sessions followed the corresponding chapters of Eurocode 2. The presentation referred not only to the provisions of EC2, but also to the relevant provisions of the existing Romanian Code on Concrete Structures. Comparisons between the two codes were made in order to familiarise the Romanian engineers with the changes that the EC2 application will bring. The papers also include working examples for a better clarification of the Eurocode design rules as well as applications and some designs.

Book summary

The volume comprises seven topics:

Topic 1 – Basis of design; Topic 2 – Analysis with the topics: Computer-aided design by Strut-and-Tie Method, simplified method for analysis of slab systems in keeping with Concise Eurocode and Romanian Code. Topic 3 – Cover, durability, and fire resistance with the topics: Cover and durability of concrete structures, cover and concrete quality for durability, durability of concrete structures: aim of the existing building inspection, fire resistance of concrete structures, general appearances about estimating fire resistance for RC elements; Topic 4 – Ultimate limit state with the topics: ultimate limit state for bending and longitudinal force, design method for shear, punching shear, ultimate limit states induced by structural deformation, torsion design for RC members; Topic 5 – Serviceability limit state with the topics: Crack control of concrete structures, deflection control of concrete structures, a comparison between EC2 and Romanian Standard concerning the limit state of cracking; Topic 6 – Prestressed concrete with the topics: Prestressed concrete fundamentals, ultimate limit state of prestressed concrete subjected to bending and axial load, prestressed concrete with partial prestressing, analysis of slab prestressed on two directions, suggestions for the analysis of prestressed concrete elements deformations, on loss of prestress due to elastic shortening of prestressed elements with pretensioned tendons; Topic 7 – Detailing provisions for reinforced concrete structural members.

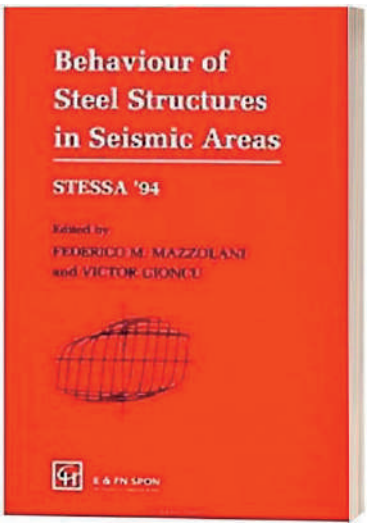
3

BEHAVIOUR OF STEEL STRUCTURES IN SEISMIC AREAS

(1995)

FEDERICO MAZZOLANI, VICTOR GIONCU (EDS.)

Publisher: CRC Press, E & FN Spon, an imprint of Chapman & Hall, 1995
ISBN: 978-0419198901



Short description of the book

This book forms the proceedings of the International Workshop organised by the European Convention for Constructional Steelwork held in Timisoara, Romania, in June 1994. It presents the latest progress in theoretical and experimental research on the behaviour of steel structures in seismic areas, taking into account the basic problems of local and global ductility, codification, design, and applications. It relates strongly to the activities on international codification taking place in Europe.

Book summary

The book contains topics on the development and design of seismic-resistant steel structures in Romania, development and design of seismic-resistant steel structures in Japan, basic problems, experimental methodologies, codification, semi-rigidity.

4

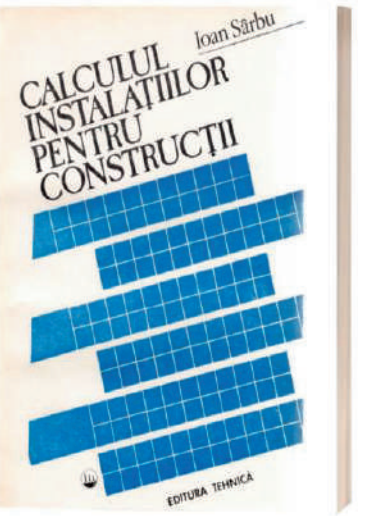
CALCULUL INSTALAŢIILOR PENTRU CONSTRUCŢII

[COMPUTATION OF BUILDING SERVICES]

(1994)

IOAN SÂRBU

Publisher: Editura Tehnică
ISBN 973-31-0525-2



Short description of the book

This book, published in 1994 by the prestigious Technical Publishing House, has been a novelty in our country, being based on the author's numerous original papers as well as on a vast bibliographic material. It is part of the general line of promotion and development of automated computing in various fields of building services.

The book systematically presents, in a unitary manner, the problems related to the main numerical and optimisation methods and to the computer-oriented algorithms for solving the various types of problems encountered in the research, design, and operation of building services.

The original contributions regarding the conception of efficient numerical analysis and simulation models, of new energy-operational optimisation methods for various types of installations and the elaboration of a computerised computing tool for the application of the presented solutions are extremely valuable and reliable from a scientific and technical point of view.

Through the complexity of the approached topics and through the original manner of presentation, this book has become a very useful tool for teachers, PhD students, and students in the technical universities as well as for scientific researchers, industrialists, consultants, or other specialists in various fields of building services engineering.

Book summary

The book is structured into six chapters.

Chapter 1 summarises some elements about using computers in numerical and optimisation calculations as well as the mathematical aspects of a computational algorithm.

Chapter 2 provides brief considerations on the most efficient numerical methods of calculating installations as well as an overview of modern modelling and numerical simulation methods of plant processes (finite difference method, finite element method), based on which the author has developed a significant number of computer programmes.

Chapter 3 focuses on several new numerical models for solving building services-specific problems.

Chapter 4 discusses the methods of operational calculation such as the mathematical programming (linear, non-linear, dynamic) and the graph-theory, describing the algorithms that are applicable to optimise installations, which are of high relevance and of great practical importance.

Chapter 5 elaborates on the complex optimisation models for computing the different types of installations, such as optimal hydraulic calculation of channels, optimal design of water, gas and heat distribution networks, optimal configuration of electrical and water supply networks, optimal design of water and heat supply networks in buildings, optimal insulation design, etc., based on which the author developed specialised computer programmes with increased performance.

Chapter 6 presents a number of examples and numerical applications for a variety of representative practical problems that facilitate the understanding of the theoretical presentation as well as a significant number of owned computer programmes written in FORTRAN 77 programming language for use on PC-compatible microsystems, with general applicability, or for solving some specialised problems.

5

COUPLED INSTABILITIES IN METAL STRUCTURES

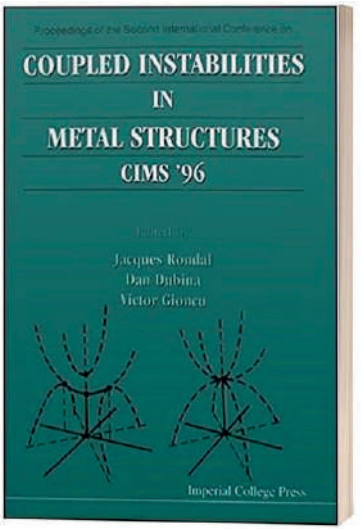
CIMS '96

PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE

(1996)

JACQUES RONDAL, DAN DUBINA, VICTOR GIONCU (EDS.)

Imperial College Press
ISBN 978-1860940330



Short description of the book

Since the early 1960s, coupled instabilities - also called compound buckling, simultaneous buckling, or interactive buckling - have been a topic that was studied by many researchers. However, despite some excellent theoretical works in this field, the relevant topic is not yet satisfactorily taken into consideration in modern design codes for metal structures. To fill up this gap and to improve the current situation, a series of "Coupled Instabilities in Metal Structures" International Conferences was launched in 1992 with the main purpose of encouraging an exchange of views between researchers and engineers on the various aspects of coupled instabilities. The success of the first conference, held in Timisoara (Romania) in 1992, and organised by Professors D. Dubina & V. Gioncu (Politehnica University of Timisoara) and J. Rondal (Univ. of Liège), has encouraged the organisation of a second conference, held in Liège (Belgium) during 5-7 September 1996.

Book summary

A brief summary of each of the main chapters of the book is presented below.

The book comprises 9 sessions:

Session 1 – Theoretical backgrounds (General report, M. Pignataro, Italy)

Session 2 – Numerical simulation and computational models (General report, K.J.R. Rasmussen, Australia)

Session 3 – Bar members, first part (General report, D. Dubina, Romania)

Session 4 – Bar members, second part

Session 5 – Frames and triangulated structures (General report, J.M. Davies, United Kingdom)

Session 6 – Plated structures (General report, M. Skaloud, Czech Republic)

Session 7 – Shell structures (General report, L.A. Samuelson, Sweden)

Session 8 – Coupled instabilities under dynamic loading (General report, V. Gioncu, Romania)

Session 9 – Design criteria and progress in design codes (General report, J. Rondal, Belgium).

6

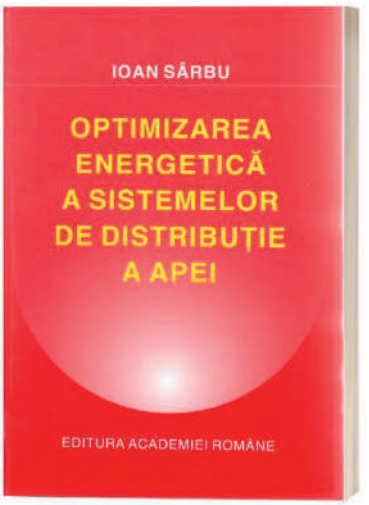
OPTIMIZAREA ENERGETICĂ A SISTEMELOR DE DISTRIBUŢIE A APEI

[ENERGY OPTIMISATION OF WATER DISTRIBUTION SYSTEMS]

(1997)

IOAN SÂRBU

Editura Academiei Române
ISBN 0-444-98842-4



Short description of the book

Through its contents and approach, this book, published in 1997 by the prestigious Romanian Academy Publishing House, represents a novelty in the literature and is part of the existing concerns on reducing electricity consumption and water loss in public water distribution systems (WDSs), which are steadily increasing.

The book treats this topic of great interest nowadays at a high scientific and technical level, based both on the original research and achievements and on the summary of a consistent bibliographic material to meet the increasing need for modernisation/ rehabilitation and for greater energy efficiency of WDSs.

The book focuses on the following categories of essential problems, inter-conditioned in the context of the approached topic: (1) the analysis of the energy consumption structure and of possible solutions for diminishing it following conceptual, constructive, and organising measures, (2) the promotion of new procedures and methods for the energy-operational optimisation of WDSs, (3) the development and improvement of methods and models for the design and analysis of WDSs, and (4) the elaboration of a computerised computation instrument for the application of the discussed solutions.

The up-to-datedness and the diversity of the approached problems are basic arguments which recommend this book, first and foremost, to engineers, scientific researchers, designers, and to other specialists in the field. It is also useful and accessible to the graduate students, MSC students, and PhD students.

This book has received the 1997 Award in the field "Energy and natural resources engineering" from the Romanian General Association of Engineers.

Book summary

The book is structured into six chapters.

Chapter 1 presents the evolution of the concept, the building of water supply systems (WSSs) and several main directions of action in this field.

Chapter 2 discusses some directions and general solutions to be considered when designing a centralised WSS to reduce electricity consumption.

Chapter 3 develops some performance computing models for an optimal resolution of complex water distribution network analysis and design problems. The first model, a refined classic model for the loop analysis and a generalised classic model for the nodal analysis of complex looped systems, is presented. Additionally, a different approach to solving this problem by using the variation formulation method and unconditioned optimisation techniques is also taken into account. The second model, two optimal design models of looped networks using the linear and non-linear programming coupled with a computational iterative procedure of optimal discharges through pipes, is formulated.

Chapter 4 includes interesting comparative studies of energy efficiency in WDSs considering the separation of water networks by pressure zones. The first aim of the chapter is to improve energy efficiency of water pumping to save pumping energy, while the second aim is to search for possible optimal network configurations that reduce electricity consumption and improve energy efficiency using potential elements and control systems to vary pump speed drive according to water demand.

Chapter 5 presents the results of a study on water damage and losses in distribution systems. The main damages that occur at the exterior network pipes are systematised and classified, and an analytical model is formulated to determine the optimal moment of replacement of the damaged pipes. Water losses and wastage are assessed in the users' interior installations and measures are recommended to substantially reduce them.

Chapter 6 describes a package of 12 computer programmes, developed on the basis of the algorithms presented in Chapters 3 and 4 in the FORTRAN 77 programming language for use in PC-compatible microsystems.

7

GRUNDWASSERHYDRAULIK. STRÖMUNGS- UND TRANSPORTVORGÄNGE

[GROUNDWATER HYDRAULICS. FLOW AND TRANSPORT PROCESSES]

(1998)

IOAN DAVID

Springer/Vieweg, Teubner Verlag

Print ISBN 978-3-528-07713-6
Online ISBN 978-3-322-91593-1
DOI doi.org/10.1007/978-3-322-91593-1

Short description of the book

The book is an introduction to the fundamentals of mathematical-numerical modelling of flow and transport processes in groundwater. For both students and practitioners, the field is becoming an increasingly important area of activity due to the growing use and impact of groundwater reservoirs.

The flow and transport processes in the aquifer and their basic equations are presented in detail in a logical and didactic order with numerous vivid illustrations, sketches, and practical examples. An integrated conception was also chosen for the presentation of the fundamentals of the most important solution methods of the flow and transport equations.

Book summary

A brief summary of each of the main chapters of the book is presented below.

1 Introduction

Overview of groundwater and aquifers; The importance of the groundwater flow and pollutant transport for engineering practice

2 Basic equations of groundwater flow

Basic equation of groundwater flow (derivation of the equation of motion in porous media empirically and with the aid of the basic equations of hydromechanics; Overview of the different forms of permeability; Special forms of the flow equation for practice-oriented problems Balance equations - continuity equations of groundwater flow, Special forms of the continuity equation for practice-oriented problems

3 Initial and boundary value problems

General description; Schematisation and Idealisation of the natural flow region; Boundary and initial conditions; Representative examples

4 Mathematical formulation of GW-problems with examples

Practical oriented examples for 1D/2D groundwater flow problems for confined and unconfined aquifer

5 Solution Methods and Examples of GW Flow Problems

Analytical solution methods for 1D/2D GW flow, Examples

Numerical solution methods for 1D/2D GW flow: Finite difference method FDM; Finite volume (cells) method FVM; Finite Element Method (FEM), Examples

Application of the FEM for 2D flow problems in confined/unconfined inhomogeneous GW

Boundary element method (BEM) for 1D/2D groundwater flow problems (basics and examples)

6 Modelling of Pollutant Transport Processes in Groundwater

Description and mathematical representation of transport processes in groundwater: Convection (Advection), Molecular Diffusion, Dispersion, Adsorption / Desorption,

Basic equations of transport processes in the aquifer: transport equations in differential and integral form,

Mathematical formulation of transport processes: Initial and boundary conditions, Transport Problems with Examples

Solution Procedures and Examples of Pollutant Transport Problems: Examples for analytic solution of transport equation; Finite Difference Method (FDM)-Finite Difference schemes of 1D flow and 1D transport; Stability analysis of difference schemes; Numerical dispersion; Finite Volume Method (FVM); Characteristic Method (CHM); Random-Walk Method;

7 Mathematical Tools (Overview)

8

BETON ARMAT

[REINFORCED CONCRETE]

(1999)

ANGHEL SALIGNY PRIZE
OF THE ROMANIAN ACADEMY

IOAN CADAR, TUDOR CLIPII, AGNETA TUDOR

EDITURA ORIZONTURI UNIVERSITARE
ISBN 973-9400-38-8

Short description of the book

The book provides the reader with the knowledge of the fundamental theory of the design of reinforced concrete structural elements. The first part of the book presents aspects regarding the structure of the concrete, its strength and deformation properties as well as those of the reinforcements. Then, it gives a detailed overview of the characteristics of the reinforced concrete element behaviour. The basic principles of calculations are followed by the presentation of exact or approximate current design methods. Besides the problems of calculation and detailing, principles regarding the economical design of reinforced concrete elements are also dealt with. The work, richly illustrated, contains data on the detailing of reinforced concrete elements and large numbers of work examples. The book provides tables and charts for the practical calculation of the reinforced concrete elements. At the time of writing the book, the European norms on the draft of the new Romanian design code for reinforced concrete elements were presented briefly in a whole chapter. Bringing together, in a coherent way, the theoretical material and the practical designing procedures, the book is a useful tool for students and can be used by design engineers as well.

In 2001, the book was awarded the Anghel Saligny Prize by the Romanian Academy.

Book summary

Chapter CONCRETE deals with the behaviour of concrete under compression, the tension and fatigue load; its deformations such as shrinkage, creep, and deformations under loads. Chapter REINFORCING STEEL reviews the main features of steel used for reinforcing concrete and the main assortments used for the reinforced concrete structural elements. Chapter REINFORCED CONCRETE deals with bond between steel and concrete, the stress analysis under service loads, the shrinkage and creep of reinforced concrete and with aspects concerning the durability. CROSS SECTION CALCULATION IN ULTIMATE LIMIT STATE deals with the general method based on strain distribution, interaction diagrams, second order effects with axial compressive force, calculation of rectangular and flanged section in bending, calculation of columns with rectangular and circular section, and finally with the calculation of tension elements. The aim of the chapter CALCULATION IN ULTIMATE LIMIT STATE IN TILTED SECTION TO SHEAR is to address the behaviour of bent elements to shear, the calculation of corresponding bars in case of bent elements with or without axial force, also dealing with corbels and punching. The case of TORSION ELEMENTS WITH BENDING is also presented. Chapter 9 has as its topic the strut-and-tie model for elements with disturbances in stress distribution: basics of the procedure, types of disturbances, calculation of nodes and elements of the model and three work examples. The following chapters present the fatigue and control of cracking and deflection. Chapter DETAILING OF REINFORCED CONCRETE ELEMENTS reviews all data which must be used in practice concerning the reinforcement of slabs, beams, and columns.

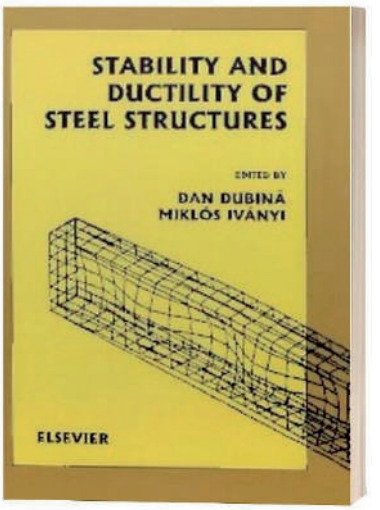
9

STABILITY AND DUCTILITY OF STEEL STRUCTURES

(1999)

DAN DUBINA, MIKLOS IVANYI (EDS.)

Elsevier Science
ISBN: 9780080430164



Short description of the book

With the gradual development of rules for designing against instability, the idea of holding an International Colloquium treating every aspect of structural instability of steel structures emerged in 1974, in London.

There have been 17 International Colloquia Stability Sessions around the world, starting with the first one in Paris in 1972, up to the last one in Nagoya in 1997. In Nagoya, it was decided to continue the series of travelling colloquia by launching the Sixth Colloquium in September 1999 with the First Session to be held at the "Politehnica" University of Timisoara, Romania, which was to be followed by another in the year 2000 at the Gediminas Technical University in Vilnius, Lithuania, a third one during SSRC's Year 2000 Annual Meeting in the US, and a fourth one in Australia or New Zealand.

Important research projects were in progress around the world, such as the SAC Joint Venture Project in USA, INCO-COPERNICUS "RECOS" in Europe and others, which were due to improve and develop new methods for the safety design of steel structures in seismic zones. Special attention is paid in Europe, USA, and Japan to improve the design codes and the detailing of seismic resistant steel structures.

This was the reason for the organisation of the "Stability and Ductility of Steel Structures" Colloquium Session of Nagoya. Romania is also a strong seismic territory and, therefore, the topic of the Timisoara Session covered both stability and ductility problems. The technical programme of the SDSS'99 Colloquium in Timisoara has been split into nine working sessions.

Book summary

Chapter headings and selected papers: Foreword.

Basic Problems. Design Concept and Codification of Steel and Composite Steel Concrete Structures. Transition from deterministic to probabilistic structural steel reliability assessment with special attention to stability problems (M. Krejsa, P. Marek). Particularities raised by the evaluation of load reduction factors for the seismic design of composite steel-concrete structures (L. Sanchez, A. Plumier).

Stability of Structural Members. Elastic lateral buckling of coped beams (R. Abspoel, J. Stark). Validation of design rules for member stability of European Standards - proposal for buckling rules (R. Greiner, R. Ofner).

Stability of Plates and Plated Structures. Towards a better knowledge about the web breathing phenomenon (Y. Duchêne *et al.*). Reduction of ultimate strength of girders due to stiffener-end-gaps (I. Okura *et al.*).

Connections. Behaviour of beam-to-column joints in moment-resisting steel frames (C. Bernuzzi *et al.*). Remarks on the use of EC3-Annex J for the prediction of aluminium joint behaviour (G. De Matteis *et al.*).

Local Ductility. Factors influencing ductility in high performance steel I-shaped beams (C.J. Earls). Ductility of plate girder panels under cyclic shear (Y. Fukumoto *et al.*).

Framed Structures: Global Performances. Static and Stability Behaviour. An advanced analysis for steel frame design: comparison with test results (A.M. Barszcz, M.A. Gizejowski). The spatial behaviour of the scaffold used for the coal conveyance (A. Ivan *et al.*). Ductility and Seismic Response. Global performance of steel moment resisting frames with semi-rigid joints (D. Dubina *et al.*). A global approach to the design of steel frames (A. Ghersi *et al.*).

Cold Formed Steel Members and Structures. Experimental verification of light structure (Z. Agócs). Elastic stability of built-up columns using the spline finite strip method (M. Djafour *et al.*).

Stability and Dynamic of Shells. Supporting towers for medium power wind turbines (A. Botici, T. Let). Behaviour of cylindrical steel shell subjected to silo loads (A. Khelil *et al.*). Stability and Ductility Problems in Steel Bridges Structures. Appraisal of existing steel bridges using modern methods (R. Bancila; *et al.*). Combined action of monoaxial bending and axial compression in the view of new Eurocode 3-Part 2: Steel Bridges (H. Šertler). Author index. Keyword index.

10

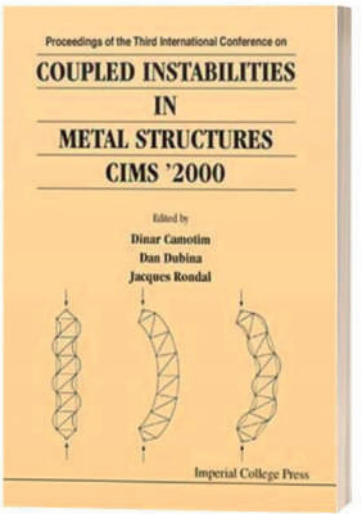
COUPLED INSTABILITIES IN METAL STRUCTURES (CIMS '2000)

PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE

(2000)

DINAR CAMOTIM, DAN DUBINA, JACQUES RONDAL (EDS.)

Imperial College Press, London
ISBN: 1-86094-252-0



Short description of the book

Since the early 1960s, coupled instabilities - also called compound buckling, simultaneous buckling, or interactive buckling - have been a topic that was studied by many researchers. However, despite some excellent theoretical works in this field, the relevant subject is not yet satisfactorily considered in modern design codes for metal structures. To fill up this gap and to improve the current situation, a series of "Coupled Instabilities in Metal Structures" International Conferences was launched in 1992, with the main aim of encouraging an exchange of views between researchers and engineers on the various aspects of coupled instabilities. The success of the first conference, held at Timisoara (Romania) in 1992, and organised by Professors D Dubina & V Gioncu (Politehnica University of Timisoara) and J Rondal (Univ. of Liege), has encouraged the organisation of a second conference, held in Liege (Belgium) during 5-7 September 1996 and the third conference, held in Lisbon (Portugal) during 21-23 September 2000.

Book summary

A brief summary of each of the main chapters of the book is presented below.

The book comprises 11 sessions:

Session 1 – Theoretical backgrounds (General report, Z. Gaspar, Hungary)

Session 2 – Numerical simulation and computational models (General report, S. Sridharan, USA)

Session 3 – Bar members (General report, D. Dubina, Romania)

Session 4 – Experimental techniques (General report, K. Rasmussen, Australia)

Session 5 – Plated structures (General report, M. Skaloud, Czech Republic)

Session 6 – Shell structures (General report, H. Schmidt, Germany)

Session 7 – Frames and triangulated structures (General report, J.M. Davies, United Kingdom)

Session 8 – Coupled instabilities under dynamic loading (General report, V. Gioncu, Romania)

Session 9 – Coupled instabilities in non-linear materials (General report, R. Landolfo, Italy)

Session 10 – Optimum design criteria (General report, J. Cardoso, Portugal)

Session 11 – Reliability and progress in design codes (General report, E. Batista, Brazil).

11

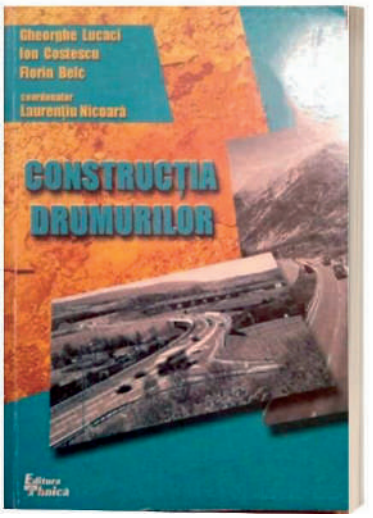
CONSTRUCȚIA DRUMURILOR

[CONSTRUCTION OF ROADS]

(2000)

LAURENȚIU NICOARĂ, GHEORGHE LUCACI,
ION COSTESCU, FLORIN BELC

Editura Tehnică
ISBN: 973-31-1506-1



Short description of the book

The compendium *Construcția drumurilor (Construction of Roads)* deals with all the elements required for road building. In this regard, it deals with the foundation ground and the technologies for the building of earthworks, granular materials and binders used in the road technique. Starting from the basic materials, it describes the composite materials (binder stabilised aggregates, asphalt mixtures and road cement concretes) used in road layers and the technologies used for their formation.

The audience targeted by the book consists mainly of road specialists as well as undergraduate, post-graduate, and Ph.D. students enrolled in the programme of infrastructures for transportation.

Book summary

Chapter 1 *Terasamente (Earthworks)* includes an analysis of the physical and mechanical characteristics of soils and of the working technologies used in the building of road earthworks. A significant part of the chapter deals with the works required by earthworks consolidation and protection and the collection and evacuation of surface and underground waters.

Chapter 2 *Materiale pentru construcția și întreținerea drumurilor (Materials Used in Road Building and Maintenance)* presents the natural aggregates, the filler and binders used in our country and abroad for building road layers.

Chapter 3 *Alcătuirea structurilor rutiere (Composition of Road Pavements)* classifies road pavements according to the national and European standards and describes the role played by each layer within the structure. It presents the forming technologies and the quality check-up methods for the layers made up of unbound natural aggregates.

Chapter 4 *Straturi rutiere din agregate naturale stabilizate* (Road Layers in Stabilised Natural Aggregates) addresses the road subbase and base layers formed with natural aggregates stabilised with different binders (hydraulic, pozzolanic, and mixed binders).

Chapter 5 *Drumuri pietruite (Cobblestone Roads)* is designed to present the technical solutions used for the building of roads with cobblestone pavements, including the macadam solution.

Chapter 6 *Îmbrăcăminți rutiere bituminoase (Bituminous Road Pavements)* is a large chapter dealing with the main type of road pavements used in Romania. It starts by defining and characterising the target quality of asphalt mixtures. It presents the procedures used for determining the optimal dosages. Then, it describes the technologies used in the formation of bituminous road pavements, depending on the type of works taken into consideration.

Chapter 7 *Îmbrăcăminți rutiere rigide (Rigid Road Pavements)* is another important section of the book describing, in accordance with the enforceable standards, the technologies of forming and verifying the quality of cement concrete road pavements. In this respect, it presents the particularities of the materials used to manufacture the concrete, the physical and mechanical quality check tests, the preparation and laying technologies.

Chapter 8 *Pavaje (Paving)* presents the road pavements locally used on roads. It deals with their materials, the execution technologies, and the maintenance and repair procedures.

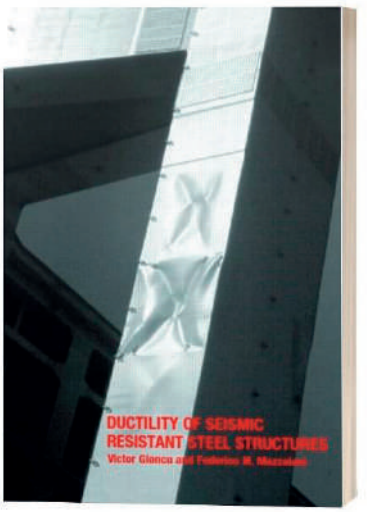
12

DUCTILITY OF SEISMIC RESISTANT STEEL STRUCTURES

(2002)

VICTOR GIONCU, FEDERICO MAZZOLANI

Spon Press an imprint of Taylor & Francis Group
ISBN: 0-419-22550-1



Short description of the book

It is generally accepted that steel is an excellent material for seismic-resistant structures. Its strength and ductility enable it to withstand substantial elastic deformations, when compared to other construction materials. However, unexpected failures during recent earthquakes have shown the need for more research into the performance of steel structures under certain conditions and for improved practical guidance.

This book provides a critical review of the recent progress in the conception, design, and construction of seismic-resistant steel structures to improve their performance during ground movements. The authors comprehensively review analytical techniques, with emphasis placed on the assessment of the structural ductility as the most efficient way to prepare and protect a structure against unexpected strong events.

Ductility of Seismic Resistant Steel Structures comes with a free Windows-based computer program on CD-ROM. This interactive tool enables the user to quickly and easily evaluate the rotation capacity of steel members in order to verify the structural ductility. This book is an essential guide for structural designers concerned with building safer and more economical steel structures. It will also serve as an authoritative reference for academics and post-graduate students in this important area of structural design.

Book summary

The main chapters of the book, with a highlight on the most important ones, are presented below:

Chapter 1 Why ductility control?

Chapter 2 Learning from earthquakes: 1985-1995 seismic decade.

Chapter 3 Basic design philosophy.

Chapter 4 Material and element ductilities.

Chapter 5 Section and stub ductilities.

5.1. Ductility erosion due to section behaviour, 5.2. Section ductility, 5.3. Stub ductility, 5.4. Ductility of I-section stubs, 5.5. Ductility of box-section stubs, 5.6. Conclusions

Chapter 6 Member ductility evaluation.

6.1. Ductility erosion due to member behaviour, 6.2. Main factors influencing the member ductility, 6.3. Assessment of the member ductility in a structure, 6.4. Effects of joints on the member ductility, 6.5. Effects of seismic loading on the member ductility, 6.6. Member behavioural classes, 6.7. Conclusions

Chapter 7 Advances in member ductility.

7.1. Recent development, 7.2. Ductility of I-section members, 7.3. Ductility of box- and hollow-section members, 7.4. Ductility of composite I-section beams, 7.5. Ductility of open-web members (trusses), 7.6. Conclusions

Chapter 8 Comprehensive methodology for ductility design.

8.1. Basis of a comprehensive methodology, 8.2. Required ductility, 8.3. Available ductility under static and monotonic actions, 8.4. Influence of seismic actions, 8.5. Structural damage, 8.6. Worked examples, 8.7. Conclusions

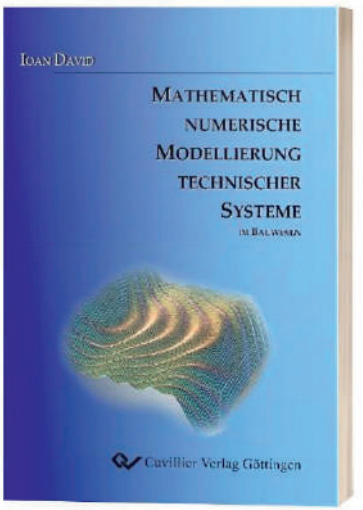
13

MATHEMATISCH-NUMERISCHE MODELLIERUNG TECHNISCHER SYSTEME IM BAUWESEN

(2005)

IOAN DAVID

Cuvillier Verlag, Göttingen
ISBN: 3-86537-590-1



Short description of the book

The use of mathematical-numerical modelling of technical systems in planning and design has become considerably more important in recent decades than conventional methods in all fields of civil engineering.

The implementation of such modelling requires both technical and mathematical knowledge through the introduction of physical system variables for the description of the considered material systems or the preparation of the basic equations and solution methods.

Engineers who are accustomed through their training to think predominantly in a practice-oriented manner apply the mathematical knowledge without always having enough such knowledge.

Mathematicians are mostly concerned with the mathematical aspects themselves, but a physical or technical interpretation of their equations and results is usually less important to them.

The result is an often-observed lack in the required, overlapping mathematical and technical knowledge that a modeller should necessarily possess.

In this book, an attempt will be made to analyse the overlapping of technique and mathematics in modelling and to illustrate it with numerous examples of mathematical-numerical modelling of technical systems in civil engineering.

As examples, we can consider representative material systems from the fields of structural mechanics, flow and transport processes in groundwater and open channels, heat conduction, etc. For some practice-oriented tasks, they are detailed with the help of mathematical formulations as boundary value problems, initial value problems, and initial-boundary value problems.

The book equally deals with the mathematical description of technical systems and their processes as well as with the interpretation and engineering of the mathematical knowledge.

It is not the focus of this book to provide new mathematical and technical insights. Rather, the connection of the existing findings from mathematics and engineering practice should be shown in the context of the modelling of the technical systems.

Thus, both mathematicians and engineers should be able to gain a deeper understanding of the subject even beyond the "box" of their own discipline.

Book summary

1 Introduction

2 Modelling of technical systems as boundary value problems Mathematical formulation of 1-D/2-D boundary value problems by means of technical examples: Stationary flow in aquifer; Stationary heat conduction; Straight beam under line load Basics of numerical methods to solve 1-D/2-D boundary value problems: Finite Difference Method - FDM); Finite Volume Method – FVM (e.g. Intervals / Cells); Finite Element Method (FEM) Applications of FDM, FVM and FEM for solving 1-D, 2-D boundary value problems

3 Numerical Methods for Solving Initial Value Problems of Technical Systems Mathematical formulation of initial value problems by means of 1st and 2nd order DGL Technical Examples and Numerical Solution Methods of Initial Value Problems in civil engineering

4 Numerical Methods and Technical Examples of Initial - Boundary Problems Mathematical formulation of Initial - Boundary Problems with representative technical examples from different fields of civil engineering Finite difference schemes for numerical solution of initial - boundary value problems with examples

Appendix

Mathematical basics as aids to mathematic-numerical modelling

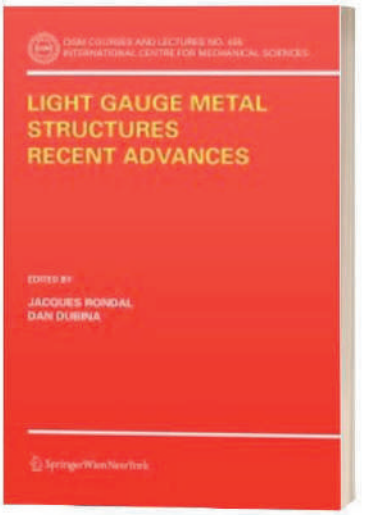
14

LIGHT GAUGE METAL STRUCTURES RECENT ADVANCES

(2005)

JACQUES RONDAL, DAN DUBINA

Springer Verlag , Berlin Wien, New York
ISBN 3-211-25258-4



Short description of the book

The aim of this book is to review recent research and technical advances, including the progress in design codes, related to the engineering applications of light gauge metal sections made in carbon, high strength, and stainless steel as well as aluminium alloys. The book also presents a review of the new technologies for connections of light gauge metal members. Main advanced applications for residential, non- residential, and industrial buildings and for pallet rack systems are also covered. For the first time, this book takes into account all the metallic materials for structural components that are being used more and more nowadays. The book will be of great interest not only to researchers, but also to the design engineers who are faced to the use of new metallic materials in modern structural applications.

Book summary

The book comprises 9 chapters:

Chapter 1 – Introduction to Light Gauge Metal Structures (J. Rondal, Belgium)
Chapter 2 – Peculiar Problems in Cold-Formed Steel Design Part 1 (D. Dubina, Romania)
Chapter 3 – Recent Advances and Progress in Design Codes: Instability Problems (J. Rondal, Belgium)
Chapter 4 – Recent Advances and Progress in Design Codes: Connections (R.A. LaBoube, USA)
Chapter 5 – Stainless Steel Structures (K.J.R. Rasmussen, Australia)
Chapter 6 – High Strength Steel Structures (K.J.R. Rasmussen, Australia)
Chapter 7 – Residential Buildings (J.M. Davies, UK)
Chapter 8 – Industrial and Non-Residential Buildings (D. Dubina, Romania)
Chapter 9 – Pallet Racking (J.M. Davies, UK

15

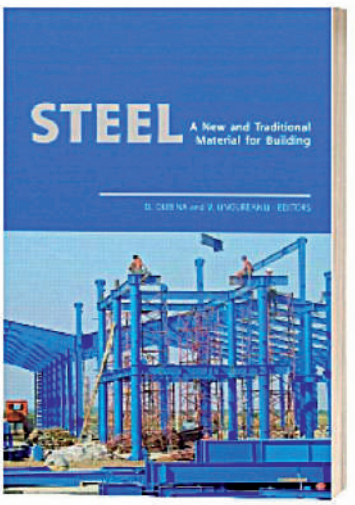
STEEL – A NEW AND TRADITIONAL MATERIAL FOR BUILDING

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE IN METAL STRUCTURES 2006, 20-22 SEPTEMBER 2006, POIANA BRASOV, ROMANIA

(2006)

DAN DUBINA, VIOREL UNGUREANU (EDS.)

CRC Press, Taylor & Francis Group, Balkema, London, ISBN: 9780415408172



Short description of the book

In an era of new, composite materials, and high-strength concrete, and with an increasing demand for sustainable building technologies, the importance of the role of steel in construction is being challenged. Nonetheless, steel can successfully be used to refurbish and retrofit historical buildings, being at the same time a material of choice for new building structures. Steel can effectively be combined with a variety of other materials to obtain structures which are characterised by a high-performance response under different types of static and dynamic activity.

This book contains the Proceedings of the 11th International Conference in Metal Structures – ICMS2006, entitled Steel - A New and Traditional Material for Building. Authors from 20 countries around the world have submitted 76 scientific papers, reviewed by members of a prestigious International Scientific Committee.

Book summary

The proceedings contain nine keynote lectures by international experts from Europe, Asia, Australia, and the USA, and are further divided into five sections:

Calculation models and methods;

Studies and advances in design codes;

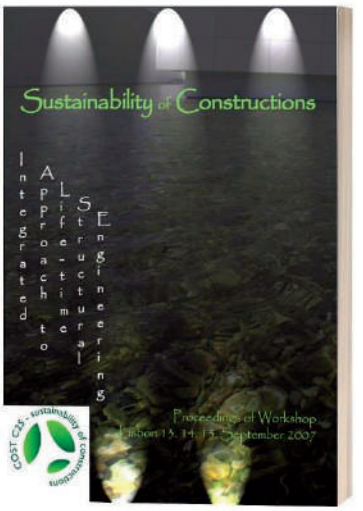
Steel and mixed building technology;

Steel under exceptional actions;

Steel in remarkable constructions and refurbishment.

16

SUSTAINABILITY OF CONSTRUCTIONS - INTEGRATED APPROACH TO LIFE-TIME STRUCTURAL ENGINEERING



COST ACTION C25

PROCEEDINGS OF THE 1ST WORKSHOP: LISBON 13-15 SEPTEMBER 2007

(2007)

L. BRAGANÇA, H. KOUKKARI, R. BLOK,
H. GERVÁSIO, M. VELJKOVIC, Z. PLEWAKO,
R. LANDOLFO, V. UNGUREANU, L.S. SILVA (EDS.)

COST Publications of EU
ISBN 978-989-20-0787-8

Short description of the book

The "Sustainability of Constructions" Workshop is the outcome of the first year of activity of COST Action C25 "Sustainability of Constructions - Integrated Approach to Life-time Structural Engineering".

The COST Action C25 was approved on 29-30 March 2006, during the 164th Meeting of the Committee of Senior Officials for Scientific and Technical Research (COST), and the Kick-off Meeting was held on 3 October 2006 in Brussels. Since its approval, 26 countries (Austria, Belgium, Croatia, Czech Republic, Cyprus, Denmark, Finland, FYR Macedonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Sweden, Turkey, and the United Kingdom) and one EC Joint Research Centre joined this project, becoming the Action C25 one of the more participated Actions in the Domain of Transport and Urban Development (TUD).

The main objective of the Action is to promote science-based developments in sustainable construction in Europe through the collection and collaborative analysis of scientific results concerning the life-time structural engineering and especially the integration of environmental assessment methods and tools of structural engineering.

Book summary

The Workshop's main topics cover a wide range of up-to-date issues and the contributions received from the delegates reflect critical research and the best available practices in the Sustainable Construction field. The issues presented include:

Criteria for Sustainable Constructions: Global methodologies, Assessment methods, Global models, Databases

Eco-efficiency: Eco-efficient use of natural resources in construction, Eco-efficient materials, Eco-efficient products, Eco-efficient processes

Life-time structural engineering: Design for durability, Life-cycle performance, Maintenance and deconstruction

17

SUSTAINABILITY OF CONSTRUCTIONS - INTEGRATED APPROACH TO LIFE-TIME STRUCTURAL ENGINEERING

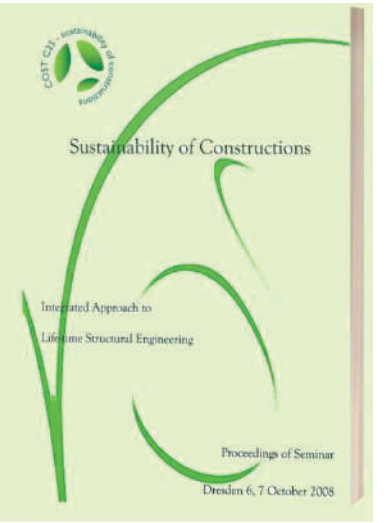
COST ACTION C25

PROCEEDINGS OF SEMINAR: DRESDEN 6-7 OCTOBER 2008

(2008)

L. BRAGANÇA, H. KOUKKARI, R. BLOK, H. GERVÁSIO, M. VELJKOVIC, Z. PLEWAKO, R. LANDOLFO, V. UNGUREANU, L.S. SILVA, P. HALLER (EDS.)

COST Publications of EU
ISBN 978-3-86780-094-5



Short description of the book

COST Action C25 "Sustainability of Constructions - Integrated Approach to Life-time Structural Engineering" celebrated its midway on 6-7 October 2008, in Dresden, Germany. The timely and ambitious objectives have inspired Members from 26 countries: Austria, Belgium, Croatia, Czech Republic, Cyprus, Denmark, Finland, FYR Macedonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Sweden, Turkey, and the United Kingdom. Nearly 100 Management Committee (MC) delegates and Working Group (WG) members have been nominated; they represent different fields of expertise, different cultures, different approaches and different visions of the society and of the world. Also, one project of EC Joint Research Centre has joined the Action. All in all, Action C25 is one of the largest Actions in the Domain of Transport and Urban Development (TUD).

The main objective of the Action C25 is to promote science-based developments in sustainable construction in Europe through the collection and collaborative analysis of

scientific results concerning life-time structural engineering. It is especially interested in integrated approaches of life-cycle assessment methods for constructions. In accordance with the Memorandum of Understanding, three Working Groups were created; they cover the three main areas of the Action: "Criteria for Sustainable Constructions", "Eco-efficiency", and "Life-time Structural Engineering".

The main topics of the Seminar cover an extensive scope of up-to-date issues and the contributions received from the delegates reflect critical research and the best available practices in the sustainable construction field.

Book summary

The book of Proceedings is organised in five chapters summarising the main work that is being performed in the Action.

Chapter 1 is an introductory chapter where the integration of methods, tools, and skills to handle data and knowledge from various domains towards "Sustainability and life-time structural engineering" is approached as the framework to guide the future work of the Action.

Chapter 2 summarises the work that is being undertaken by the working group WG1 "Criteria for Sustainable Construction". The achievements obtained in the theoretical study and on the criteria for sustainable constructions reported in this Seminar are an important step forward.

The survey on the different approaches towards sustainability assessments carried out amongst a number of member states show that there are still big differences.

Chapter 3 focuses on "Eco-efficiency" and discusses solutions for the improvement of the environmental performance, energy performance and comfort in buildings through the use and the integration of innovative systems in construction.

Chapter 4 deals with "Life-time structural engineering" and addresses the questions whether a chosen design life can be achieved with reasonable certainty due to the unique character of each structure. The relationship between the materials used for structure, the components and the structure itself is often complicated and this may lead to variability in the design of the structure, in the environment in which the structure is built and required to operate on and in social aspects.

Chapter 5 presents some "Case-studies" and includes guidelines to perform Life Cycle Analysis of buildings and bridges that were specifically developed in the framework of the Action.

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SUSTAINABILITY OF CONSTRUCTIONS - INTEGRATED APPROACH TO LIFE-TIME STRUCTURAL ENGINEERING

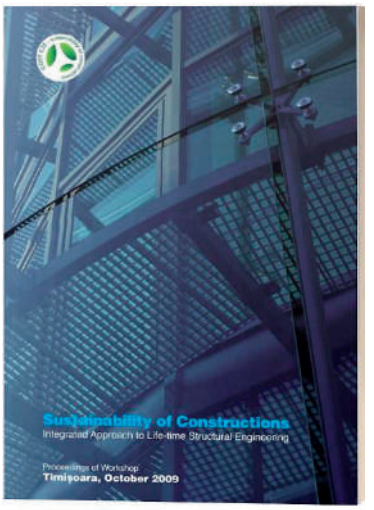
COST ACTION C25

PROCEEDINGS OF WORKSHOP: TIMIŞOARA 23-24 OCTOBER 2009

(2009)

L. BRAGANCA, H. KOUKKARI, R. BLOK, H. GERVASIO, M. VELJKOVIC, Z. PLEWAKO, R. LANDOLFO, V. UNGUREANU, L. S. SILVA (EDS.)

COST Publications of EU
ISBN 978-973-638-428-8



Short description of the book

This book represents one more exciting milestone in the fulfilment of the main aims of the Action. It covers contributions of the 2nd Workshop on "Sustainability of Constructions" held in Timisoara on 23-24 October 2009.

This book is the product of joint efforts of the action members, prepared in an inspirational, although virtual environment of the collaborative work. About 100 members from 27 countries (Austria, Belgium, Croatia, Czech Republic, Cyprus, Denmark, Finland, FYR Macedonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Sweden, Switzerland, Turkey, and the United Kingdom) and the Ispra EC Joint Research Centre actively participated in the preparation of the Workshop.

One of the main objectives of the C25 Action is to promote science-based developments in sustainable construction in Europe through the collection and collaborative analysis of scientific results concerning life-time structural engineering. The emphasis is on integrated approaches of life-cycle assessment methods for constructions. In accordance with the Memorandum of Understanding, three Working Groups, created at the beginning of the

action, cover the main areas of the Action: "Criteria for Sustainable Constructions", "Eco-efficiency" and "Life-time Structural Engineering".

The main focus of 2nd C25 Workshop is on up-to-date issues and the contributions received from the members reflect the on-going research and the best available practices in the sustainable construction field.

Book summary

The book starts with an optimistic view on the future of the mankind and an appeal for more consistent work on sustainable construction as part of the necessary improvements of the building sector. Current problems and opportunities are presented and methods for assessing the future problems are briefly introduced in order to explain various world scenarios. Afterwards, many important aspects of life-time structural engineering are addressed, starting with the state-of-the-art of degradation modes and models for different construction materials such as concrete, masonry and timber structures and the application of the degradation models to the durability design.

Overviews of developments on service life design of reinforced concrete structures with emphasis on probabilistic approach are also taken into consideration. Further, maintenance, repair, and rehabilitation techniques as well as planning are discussed. Selected contributions give guidance for masonry, concrete, steel, composite and glass fibre reinforced polymeric structures. Specific problems both for buildings and bridges are highlighted. Theory and practice are discussed and existing software aids and professional documentation are presented. In addition, condition assessment procedures as well as monitoring techniques are comprised in these contributions. Finally, deconstruction at the end of the service life is addressed; sustainable and economic deconstruction decision and technologies are introduced and demonstrated in particular examples. Some results of the collaborative work that is being carried out in the form of Case-studies are presented, considering various solutions on a single question. The case-studies are being continuously developed and reassessed during the Action by increasing the complexity from simple structures to complex and more realistic constructions. Given the complexity and the nature of the topics of the Action, where meaningful results can be obtained only if all aspects are adequately covered, the case-study approach is crucial for the success of the integration of the knowledge about sustainability in structural engineering.

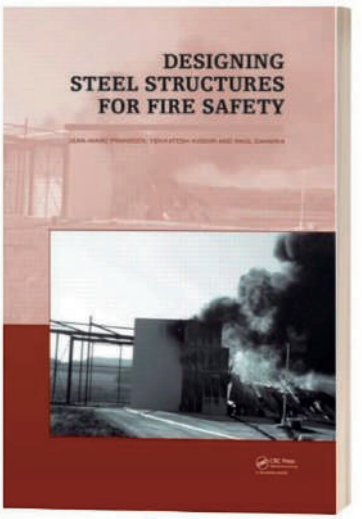
19

DESIGNING STEEL STRUCTURES FOR FIRE SAFETY

(2009)

JEAN-MARC FRANSSEN, VENKATESH KODUR, RAUL ZAHARIA

CRC Press Taylor & Francis Group
ISBN: 9780415548281



Short description of the book

Structural design in fire conditions is conceptually similar to structural design in normal temperature conditions, but more difficult because of the internal forces induced by thermal expansion, strength reduction due to elevated temperatures, much larger deflections, and other factors. The science of designing structures for fire safety has grown in the last decades, accompanied by the development of sophisticated codes of practice, such as the Eurocodes. These documents represent the best international consensus on design rules for structures exposed to fires. Similarly, codes and standards in the US and the rest of the world are being updated with rational design provisions for evaluating the fire resistance.

The book provides guidance for those wishing to apply rational engineering methodologies for fire design of steel structures. Codes alone do not provide enough information for structural design, especially as they become more sophisticated and comprehensive. This book should help the reader not familiar with the topic to make calculations of the fire resistance of steel structures in accordance with the Eurocodes or other code provisions. The theoretical or historical background is provided when this helps the user to better understand the calculation methodologies, while examples on simple elements and guidance showing how a complete structure can be analysed are included.

Designing Steel Structures for Fire Safety is a major contribution to the wider understanding of structural behaviour in fires and is intended for professionals in civil engineering and architecture, students or teachers, building officials and regulators in all regions of the world.

Book summary

Chapter 1 "Introduction" presents the general layout of the book and the principles of the structural fire design, together with a brief presentation of the European and North American codes and standards related to the fire design of steel structures.

Chapter 2 "Mechanical loading" deals with the basis of design and mechanical loads.

Chapter 3 "Thermal action" summarises the thermal response from the fires.

Chapter 4 "Temperature in steel sections" reviews the thermal analysis by simple calculation models.

Chapter 5 "Mechanical analysis" discusses mechanical analysis by simple calculation models.

Chapter 6 "Joints" deals with the design of joints.

Chapter 7 "Advanced calculation models" offers some insight into thermal and mechanical analysis by advanced calculation models.

Chapter 8 "Design examples" gives some applications showing how a complex structure can be designed using the concept of element or substructure analysis.

The book also contains two annexes, which present the thermal and mechanical properties of carbon steels, but also some tables and nomograms created by the authors to be used with the simple calculation models:

Annex I "High temperature properties and temperature profiles"

Annex II "Mechanical properties of carbon steels"

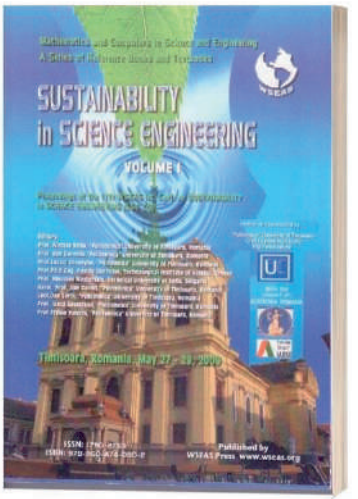
20

SUSTAINABILITY IN SCIENCE ENGINEERING, VOLUME 1

(2009)

N. ROBU, C. BOB, G. LUCACI, D. PAVLOU, N. MASTORAKIS, D. DAN, S. DAN, S. IANCA, V. STOIAN (EDS.)

WSEAS Press
ISBN 1790-2769



Short description of the book

The 11th WSEAS International Conference on Sustainability in Science Engineering (SSE'09) was held in Timisoara, Romania. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of sustainability in civil engineering and infrastructure, mechanical engineering, electrical and electronical engineering, chemical engineering, etc. with participants from all over the world, both from the world of academia and from the industry. Its success is reflected in the papers received from the participants from all over the world, both from the wold of academia and from the industry. 43 papers were published and 5 plenary lectures were given by authors coming from six countries.

The papers published in this Book are indexed by ISI Proceedings. For the building industry, the calculated components of the sustainability such as the energy incorporated in the main raw materials as well as used during the service life of a building, the total cost for erection and the social parameters (strength, durability, life quality, etc.) were taken into account. The main concept of sustainability is to design buildings with a long service life, low operating and maintenance costs, and high energy efficiency.

Book summary

The Conference has been hosted and sponsored by WSEAS, "Politehnica" University of Timisoara, the Romanian Academy-Timisoara Branch and the Romanian Group of IABSE (International Association for Bridge and Structural Engineering).

The Plenary Lectures were presented by N. Jula (Bucharest) – Aspects on Compact Electrical drive systems; D.G. Pavlou (Halkida-Greece) - Life-time prediction of structural parts under variable creep conditions; Camelia Bulucea (Craiova) – Technical systems sustainability approach to framing industrial ecosystems; C. Bob (Timisoara) - Sustainability of new and strengthened buildings; Valentina Balasand M. Balas (Arad) – A sustainable feeding system for our future: the passive greenhouse.

The 43 papers presented at the Conference SSE'09 covered the following topics:

- Civil engineering, 11 papers which refer to various sub-topics such as modern solutions for strengthening the structures; properties of concrete elements as self-compacting concrete, ultra-high performance concrete, creep, shrinkage, non-linear behaviour, etc.; steel or reinforced concrete precast or cast in situ for buildings.
- Information technology with 7 papers on control system simulator with PLC; laser scanning airborne system – a new step in engineering surveying; the backpropagation algorithm functions for the multilayer perception, etc.
- Geology, foundation, and roads, 6 papers with the sub-topics such as numerical analysis of rail-subgrade systems; experimental lab. studies on the influence of foundation on the soil; geotechnical aspects regarding the rehabilitations of a retaining wall, etc.

Other fields with different topics such as geodesic engineering - important tool for seismicity study; helping architects to design their personal day light; heat distribution in a steel plate, etc

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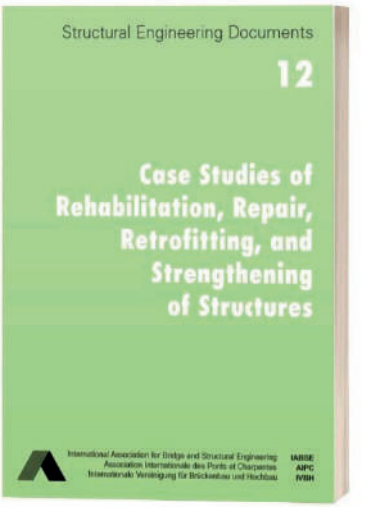
STRENGTHENING OF THE FRAME STRUCTURE AT THE TIMIŞOREANA BREWERY, ROMANIA

CORNELIU BOB, SORIN DAN, CATALIN BADEA, AURELIAN GRUIN, LIANA IURES

BOOK CKAPTER PUBLISHED IN CASE STUDIES OF REHABILITATION, REPAIR, RETROFITTING, AND STRENGTHENING OF STRUCTURES

MOURAD BAKHOUM, JUAN SOBRINO (EDS.)

IABSE-AIPC-IVBH, ETH Honggerberg
ISBN 978-3-85748-124-6



Short description of the book

The monograph provides case studies of structural rehabilitation, repair, rehabilitation, strengthening, and upgrading of structures, which might be encompassed - in short - by the convenient umbrella terms "Conservation / Maintenance / Preservation / Upgrading of Existing Structures".

A large part of existing buildings, bridges and other structures may have a long service life, where they could be subjected to severe environmental and/or operational conditions. These structures represent a strategic heritage of our societies and have an enormous economic value. Due to deficient or absent maintenance, changed operational conditions, new functional requirements, new code provisions, and/or safety necessities, a large number of structures could require to be structurally strengthened, repaired, upgraded, widened, refurbished, reutilised, or rehabilitated. In most of the cases, repair / modification is more convenient than replacement.

Strengthening, rehabilitation, repair, and retrofitting of structures is usually a challenging task because of uncertainties associated with old structures, restrictions on the geometry and materials used, and other structural or functional constraints.

When repairing / upgrading the structural performance of an existing structure, the engineers involved have plenty of possibilities, lots of constraints and, in some cases, there are no applicable codes. Strengthening, rehabilitation, repair, and retrofitting is sometimes a complex and exciting work; an art. Restoration, structural renovation, and upgrading of

structures is also involving enormous professional responsibility. The monograph is a summary of practices to help structural engineers.

Book summary

UPGRADING THE SEISMIC SAFETY OF THE CHRITZI BRIDGE, SWITZERLAND: a method of seismic safety improvement of bridges; it takes into account structural security, serviceability, durability, and resistance towards earthquakes.

STRENGTHENING WITH PRESTRESSED CFRP STRIPS OF BOX GIRDERS ON THE CHOFU BRIDGE, JAPAN: reinforced concrete box girders of the Chofu Bridge strengthened using tensioned carbon fiber reinforced polymer strip method.

PUNCHING SHEAR STRENGTHENING AT THE NEW STATION SQUARE IN BERNE, SWITZERLAND: reinforced concrete slab of the reconstructed Station Square in Berne strengthened against punching shear by new inclined bonded bars.

Chapter 5 – STRENGTHENING OF THE FRAME STRUCTURE AT THE TIMISOREANA BREWERY, ROMANIA: a brewery with reinforced concrete framed structure built in 1961 – 1971; rehabilitation performed by jacketing with reinforced concrete and carbon fiber reinforced polymer composites for beams and columns.

STRENGTHENING AND REHABILITATION OF A HEATING PLANT CHIMNEY, IN POLAND: a case study of reinforced concrete chimney repair, strengthening, and finally general modernisation.

REHABILITATION OF THE KUMHO GROUP SEOUL HEADQUARTERS, KOREA: a case study of an office building rehabilitation in Seoul, Korea; because of the long-term stop of the construction and change of the architectural design, large-scale repair and rehabilitation work done in 2006.

STRENGTHENING THE MURHASAARI BRIDGE WITH EXTERNAL PRESTRESSING, FINLAND: a bridge with deflection increased, extensive cracking and insufficient load carrying capacity disclosed; the strengthening in 1999 with post-tensioning using external cables, placed inside the box chambers.

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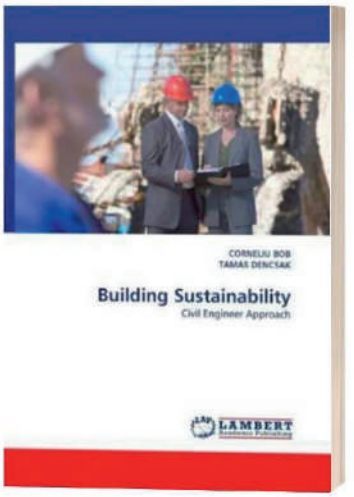
BUILDING SUSTAINABILITY. CIVIL ENGINEER APPROACH

(2010)

CORNELIU BOB, TAMAS DENCSÁK

Lambert Academic Publishing, Saarbrücken
ISBN 978-3-8433-7441-5



Short description of the book

The mission of structural engineering is to design and construct safe structures by making appropriate decisions. At the same time, society also has a strong demand for sustainability, to which structural engineers can contribute through their decisions. Such decisions are necessary at every step of the design, construction, maintenance, and demolition processes.

Some important aspects concerning building sustainability are presented in the book. In the first part, the concept of sustainable development and its position in the scientific world is discussed. The main aspects of some sustainability certificates are evaluated, a comparison between these tools is made and some important ideas are emphasised. In the second part, the authors proposed two proper models to evaluate the sustainability of a building or strengthening solution. The first one is a global model and the second model is based on a simple formula.

The book is intended for research and design workers, engineers, teachers, and students as well as for all those interested in the sustainability of every step of the design, erection, and maintenance of a building.

Book summary

The book has two main parts: an introduction with the presentation of the well-known sustainability models in the world, and the second part comprising the authors' models and some examples of their applications.

The international certificate and models for the building industry sustainability comprised by the book are the Building Research Establishment Environmental Assessment Method (BREEM), 1990, UK; the Leadership in Energy and Environmental design (LEED), 1993, USA; Deutsche Gütesiegel für Nachhaltiges Bauen (DGNB), 2009, Germany; the Comprehensive Assessment System for Building Environmental Efficiency (CASBEE), 2001, Japan; the International Initiative for a Sustainable Built Environment (SB Tool), 1996, International.

The authors have proposed their "Bob-Dencsák" global model, characterised by three dimensions: environmental, with 21 criteria and a 40% weighing factor; economic, with 12 criteria and a 30% weighing factor; and social, with 13 criteria and a 30% weighing factor. On the other hand, a specific model was also proposed. The model aims at helping engineers to assess the sustainability performance of different construction works. The main advantages of this method are the following: it covers the three dimensions of sustainability, has a high degree of applicability, and includes only quantitative parameters. For both models, some applications are presented.

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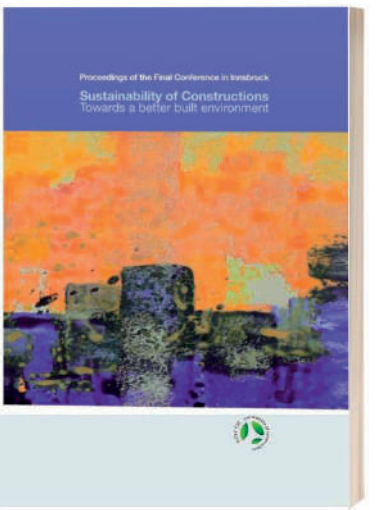
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE: SUSTAINABILITY OF CONSTRUCTIONS – TOWARDS A BETTER BUILT ENVIRONMENT



FINAL CONFERENCE OF THE COST ACTION C25
3-5 FEBRUARY 2011, INNSBRUCK, AUSTRIA

(2011)

L. BRAGANÇA, H. KOUKKARI, R. BLOK, H. GERVÁSIO, M. VELJKOVIC, R.P. BORG, R. LANDOLFO, V. UNGUREANU, C. SCHAUR (EDS.)

COST Publications of EU
ISBN 978-999957-816-0-6

Short description of the book

This publication is the Proceedings of the Final Conference of the COST Action C25, opened to the public under the "Sustainability of Constructions - Towards a better built environment" topic. The Action C25's "Sustainability of Constructions - Integrated Approach to Lifetime Structural Engineering" topic was established to promote science- and research-based approaches for life-cycle building technologies. It is one prominent landmark of a worldwide movement aiming at knowledge creation and dissemination in the field of sustainable construction. The number of sustainability-conscious researchers, stakeholders, and practitioners has grown from some tens of pioneers to tens of thousands. The methods of sustainable architecture and life-time engineering have been developed and implemented more often as part of everyday practices. Several international networks and organisations have been established in order to promote the sustainable construction such as, e.g. the International Initiative for a Sustainable Built Environment (iiSBE) and the International Association for Life Cycle Civil Engineering (IALCCE).

The Kick-off Meeting of the Action C25 was held on 3 October 2006 in Brussels. In total, 28 countries (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Finland, FYR Macedonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Sweden,

Switzerland, Turkey, and the United Kingdom) and one EC Joint Research Centre have joined this network. The participating countries nominated almost 100 Management Committee (MC) delegates and Working Group (WG) members who represent different fields of expertise, different cultures, different approaches and different visions of the society and the world. Ten Management Committee meetings were organised in nine COST countries during the four years that the Action was active.

This publication represents one more important milestone in the fulfilment of the main aims of the COST Action C25. The organisers of the conference hope that it will inspire all the participants to work towards changing the trends in the construction field and the use of the built environment.

Book summary

These Proceedings cover a wide range of up-to-date issues that reflect the research done by the participating countries in the field of sustainable constructions. The presented topics include:

- Eco-efficient materials and technologies
- Innovative construction systems
- Sustainability Assessment of Constructions
- Adaptation to Climate Change
- Design and Technologies for Energy Efficiency
- Life-time structural engineering
- Maintenance and Monitoring
- Renovation and Retrofitting
- Policy for sustainable development

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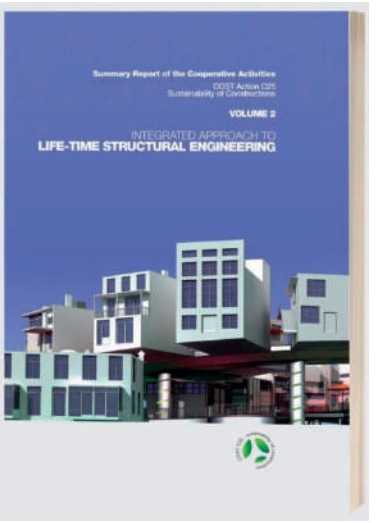
SUSTAINABILITY OF CONSTRUCTIONS - INTEGRATED APPROACH TO LIFE-TIME STRUCTURAL ENGINEERING

SUMMARY REPORT OF THE COOPERATIVE ACTIVITIES. COST ACTION C25. VOLUME 2

(2011)

LUÍS BRAGANÇA, HELI KOUKKARI, RAFFAELE LANDOLFO, VIOREL UNGUREANU, ERKKI VESIKARI, OLIVER HECHLER

COST Publications of EU
ISBN 978-99957-816-2-0



Short description of the book

This publication is the Final Outcome of the COST Action C25 "Sustainability of Constructions: Integrated Approach to Life-time Structural Engineering" which includes research reports, datasheets and guidelines in two Volumes. The Action actively involved more than one hundred researchers, engineers and architects from 28 countries during four years beginning with December 2006.

The Action has summarised its research field by the completion of "Sustainability of Constructions" that refers to creative combination of structural engineering methods with those of sustainable construction. The Action Members have collaboratively examined theories, methods and tools for cross-boundary and trans-disciplinary knowledge production, management and communication. These include approaches to assess environmental, social and economic impacts of construction activities; methods to analyse and verify eco-efficiency of materials, components, buildings and infrastructures; and methods of structural design that incorporate holistic understanding of safety, eco-efficiency and sustainability.

The Action has been a scientific, social and cultural journey that has given opportunities not only to co-operate over the borders, but also to learn about various traditions. Ten Management Committee meetings were organised in nine countries, from Norway to Turkey and from Portugal to Romania. Most of them were large gatherings with invited experts, merged working groups and team meetings. The events with true milestone results are the

launching meeting in Eindhoven in December 2006, the First Workshop in Lisbon in 2007, the Mid-term Conference in Dresden in 2008, the Open Seminar in Naples in 2009 and the Second Workshop in Timisoara in 2009. The Action also organised Training Schools in Eindhoven in 2008, in Thessaloniki in 2009 and in Valletta in 2010. A Student Competition took place in 2008-2009.

Book summary

The book is structured in five chapters, each corresponding to one of the expected WG3 output as it is reported in the Memorandum of Understanding. In particular, the first two chapters, corresponding to the expected Deliverable 8.1 and 8.2, represent the outcome of the WP8, and the remaining three chapters, matching the Deliverables D9.1, D9.2 and D9.3, summarise the activities carried out within WP9.

The Deliverables were edited and revised with the contribution of E. Vesikari and O. Hechler, coordinators of WP8 and WP9, to whom I would like to express my gratitude for the excellent work done in the management of the research activity during these years.

Finally, I would like to thank V. Ungureanu, vice-chair of WG3, and all the people that contributed actively to the achievement of the results presented in this book.

Chapter 1. State-of-the-Art Report on Service Life Prediction and Design Methodologies
Chapter 2. State-of-the-Art Report on Deterministic and Probabilistic Degradation Models
Chapter 3. Survey and condition assessment of structures
Chapter 4. Maintenance, repair and rehabilitation techniques and planning
Chapter 5. Demolition and deconstruction

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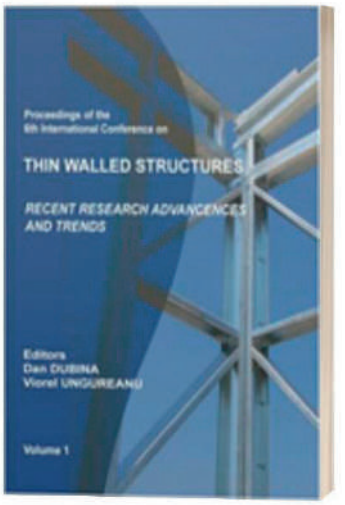
THIN-WALLED STRUCTURES: RECENT RESEARCH ADVANCES AND TRENDS

(2011)

DAN DUBINA, VIOREL UNGUREANU (EDS.)

ECCS-European Convention for Constructional Steelwork, Ernst & Sohn
ISBN 978-92-9147-102-7



Short description of the book

Every scientific event devoted to Thin Walled Structures – conferences, symposia or workshops, where professional engineers and researchers join to present their results and exchange experiences, offers the opportunity to meet challenging solutions and real achievements. That is why the highly successful series of international Conferences on Thin Walled Structures started in December 1996 in Glasgow continued with the ones in Singapore (1998), Krakow (2001), Loughborough (2004) and Brisbane (2008). The series arrived to the 6th edition, held in Timisoara, Romania in September 5 – 7, 2011.

Book summary

The Proceedings of ICTWS 2011 – RECENT RESEARCH ADVANCES AND TRENDS, organized in two volumes, contain 9 keynote lectures presented by outstanding scientists and 115 papers, by authors from 33 countries of Africa, Asia, Australia, Europe, North America and South Africa. These papers are grouped in 9 main topics i.e.:

Session 1: Buckling;
Session 2: Post-bucking analysis and failure modes;
Session 3: Behaviour of thin-walled structures under extreme loadings;
Session 4: Connection on thin-walled structures;
Session 5: Cold-formed steel structures;
Session 6: Composite structures;
Session 7: Storage racking;
Session 8: Shell and space structures;
Session 9: Plated Structures.

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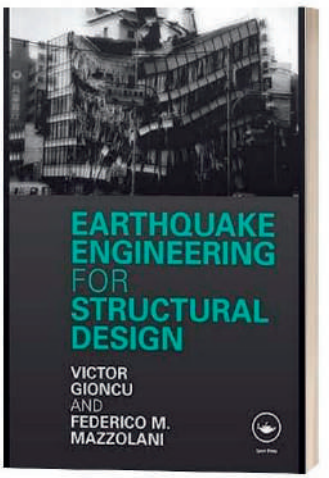
EARTHQUAKE ENGINEERING FOR STRUCTURAL DESIGN

(2011)

VICTOR GIONCU, FEDERICO M. MAZZOLANI (EDS.)

Spon Press an imprint of Taylor & Francis
ISBN 0-444-98842-4



Short description of the book

Developments in Earthquake Engineering have focused on the capacity and response of structures. They often overlook the importance of seismological knowledge to the earthquake-proofing of design. It is not enough only to understand the anatomy of the structure, you must also appreciate the nature of the likely earthquake.

Seismic design, as detailed in this book, is the bringing together of Earthquake Engineering and Engineering Seismology. It focuses on the seismological aspects of design – analyzing various types of earthquake and how they affect structures differently. Understanding the distinction between these earthquake types and their different impacts on buildings can make the difference between whether a building stands or falls, or at least the price to repair it.

Covering the basis and basics of the major international codes, this is the essential guide for professionals working on structures in earthquake zones around the world.

The book is based on a selection of the results of many papers, reports, conference proceedings, as well as information from the internet. At the same time, the authors' experience in earthquake research and seismic design of structures played an important part in the book elaboration. Being aware that this is an attempt, maybe the first one, to present the problems of both Engineering Seismology and Earthquake Engineering in a unitary way, to try to provide the basics of a proper Structural Design, this book is expected to receive criticisms from the specialists belonging to both fields.

Book summary

These are the chapters of the book, with a highlight on the most important ones.

Chapter 1 New Challenges in Seismic Design.
Chapter 2 Living with Earthquakes.
Chapter 3 Learning from Earthquakes.
Chapter 4 Advances in Conception about Earthquakes.
Chapter 5 Tectonic Plates and Faults.
Chapter 6 Faults and Earthquakes.
Chapter 7 Earthquakes and Ground Motions.
Chapter 8 Ground Motions and Structures.

8.1. Structure Influence on Ground Motions, 8.2. Foundation Responses, 8.3. Structure Responses, 8.4. Developments of Materials for seismic-resistant structures, 8.5. Developments of Steel Structural Systems, 8.6. Soil-foundation-structure Interaction, 8.7. Seismic Vulnerability Factors

Chapter 9 Advances in Seismic Design Methodologies.

9.1. Challenges in Seismic Design, 9.2. Performance-based Seismic Design: Implication of Owners, Users and Society, 9.3. Development of Multi-level Base Seismic Design, 9.4. Response Spectra as Representation of Ground Motions, 9.5. Seismic Analysis Procedures, 9.6. Behaviour of Non-structural Components during Earthquake

Chapter 10 Challenges for Next Code Generation of Seismic Codes.

10.1. Developments of Seismic Design Codes, 10.2. Progresses in Seismic Design Codes, 10.3. Challenges for New Design Approaches, 10.4. Characteristics of Earthquakes in Function of Source, 10.5. Structural Response to Interplate Crustal Earthquakes: Near-source Ground Motions, 10.6. Structural Response to Intraplate Crustal Earthquakes: Low-to Moderate Ground Motions for Crustal Fractures, 10.7. Structural Response to Intraslab Deep Earthquakes: Long Duration Earthquakes, 10.8. Recommendations for Developing Simple but Reliable New Code Provisions

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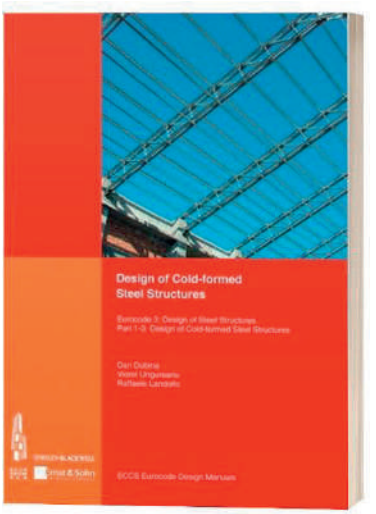
DESIGN OF COLD-FORMED STEEL STRUCTURES

(2012)

DAN DUBINA, RAFFAELE LANDOLFO,
VIOREL UNGUREANU

ECCS – European Convention for Constructional Steelwork
Ernst & Sohn, A Wiley Company, Berlin
ISBN 978-3-433-02979-4



Short description of the book

The book is concerned with design of cold-formed steel structures in building based on the Eurocode 3 package, particularly on EN 1993-1-3.

It contains the essentials of theoretical background and design rules for cold-formed steel sections and sheeting, members and connections for building applications.

Elaborated examples and design applications - more than 200 pages - are included in the respective chapters in order to provide a better understanding to the reader.

REVIEWS: "The authors are clearly extremely experienced in the structural design and behaviour of cold-formed steel and they are also deeply knowledgeable about the content of EN 1993-1-3. The credentials of the authors and fact that the book forms part of the ECCS series of Eurocode Design Manuals means that this will become an authoritative text for engineers with an interest in the design of cold-formed steel." (The Structural Engineer, 1 July 2013)

Book summary

CHAPTER 3 BEHAVIOUR AND RESISTANCE OF CROSS SECTION

3.1 General, 3.2 Properties of gross cross section, 3.3 Flange curling, 3.4 Shear lag, 3.5 Local buckling, 3.6 Distortional buckling: analytical methods for predicting elastic distortional buckling stresses, 3.7 Design against local and distortional buckling according to EN 1993-1-3, 3.8 Resistance of cross-section

CHAPTER 4 BEHAVIOUR AND DESIGN RESISTANCE OF BAR MEMBERS

4.1 General, 4.2 Compression members, 4.3 Buckling strength of bending members, 4.4 Buckling of members in bending and axial compression, 4.5 Beams restrained by sheeting, 4.6 Design of beams at serviceability limit states

CHAPTER 5 SHEETING ACTING AS DIAPHRAGM

5.1 Introduction, 5.2 General design considerations on diaphragm action, 5.3 Design procedures for sheeting acting as diaphragm, 5.4 Interaction of the shear diaphragms with supporting framing, 5.5 Diaphragm action of sandwich panels

CHAPTER 6 STRUCTURAL LINER TRAYS

6.1 Introduction, 6.2 Design procedures for cassette sections, 6.3 Design procedures for cassette panels acting as diaphragm, 6.4 Combined effects

CHAPTER 7 CONNECTIONS

7.1 Introduction, 7.2 Fastening techniques of the cold-formed steel constructions, 7.3 Mechanical properties of connections, 7.4 Design of connections, 7.5 Design assisted by testing cold-formed steel connections

CHAPTER 8 BUILDING FRAMING

8.1 General information, 8.2 Introduction, 8.3 Construction systems, 8.4 Stick built constructions, 8.5 conceptual design, 8.6 Structural design, 8.7 Case study: residential building

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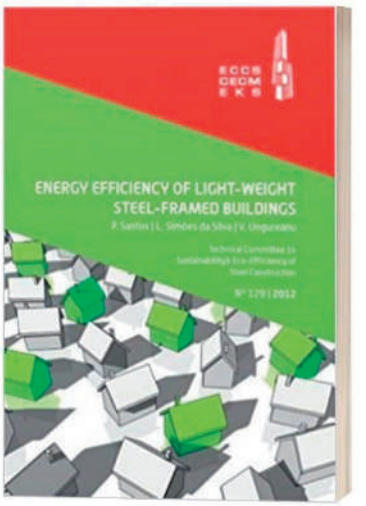
ENERGY EFFICIENCY OF LIGHTWEIGHT STEEL-FRAMED BUILDINGS

(2012)

PAULO SANTOS, LUIS SIMOES DA SILVA, VIOREL UNGUREANU

ECCS – European Convention for Constructional Steelwork
ISBN 978-92-9147-105-8



Short description of the book

The Technical Committee TC14 "Sustainability and eco-efficiency of steel construction" was founded within the European Convention for Constructional Steelwork (ECCS) with the main goal of promoting the developments in industry, in research and teaching communities that lead towards increased understanding and capabilities in relation to sustainable steel construction. One suitable approach to promote and disseminate sustainability and ecoefficiency of steel construction is to support the publishing of brochures, leaflets, scientific papers, "red books" or European recommendations, and design manuals addressing these issues. Therefore, several working groups were created within TC14 in order to define scope, contents and contributions from the TC14 members.

Three main topics were defined: (1) Energy-efficiency of steel-framed buildings; (2) Eco-design of steel-framed buildings; and (3) Integral lifetime design of bridges. Moreover, it was agreed that energy efficiency is a top priority due to tightening regulation and new action plans of the EU. In this context, the present ECCS "red book" entitled "Energy Efficiency of Light-weight Steel-framed Buildings" is the first publication of the TC14. This publication intends to provide guidelines to achieve optimal thermal behaviour and high energy efficiency in cold-formed low-rise residential buildings, in order to reduce greenhouse gas emissions and energy bills, maintaining levels of thermal comfort of occupants.

In relation to the recent CEN standards on Sustainability of Construction Works, this publication copes with module B6 "Energy use to operate building integrated technical systems". The remaining modules addressed in these standards will be covered in upcoming TC14 publications.

Book summary

The book is structured in two main parts: (1) Design guidance; and (2) Design example. The first part is organised in seven chapters dealing with several relevant issues, namely: Sustainable energy; Climate characterization; Low-rise residential light-weight steel framing; Calculation methods to assess energy performance of buildings; Thermal bridges; Thermal inertia; and Design guidance. The second part of this publication presents a case-study for the design example: Low rise residential building in Portugal.

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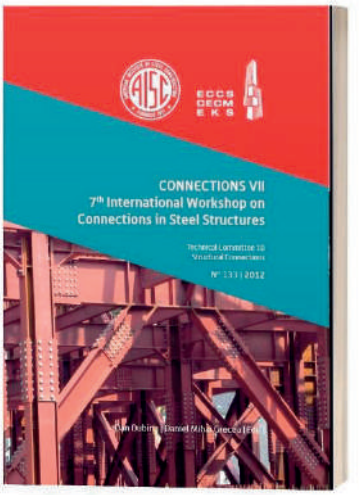
CONNECTIONS IN STEEL STRUCTURES

CONNECTIONS VII, 7TH INTERNATIONAL WORKSHOP

(2013)

DAN DUBINA, DANIEL GRECEA

ECCS – European Convention for Constructional Steelwork
ISBN 978-92-9147-114-0



Short description of the book

The International Workshop on Connections in Steel Structures (Connections I), jointly organized by the European Convention for Constructional Steelwork (ECCS) and the American Institute of Steel Construction (AISC) has been held since 1987. It started in Paris (Cachan), and was followed by Connections II in 1991 (Pittsburgh, Pennsylvania), Connections III in 1995 (Trento), Connections IV in 2000 (Roanoke, Virginia), Connections V in 2004 (Amsterdam) and Connections VI in 2008 (Chicago).

The success of the "Connections" series has been confirmed by the number of outstanding scientists and engineers, mainly from Europe and the USA, but also from other areas, who, over the years, have contributed to the workshops with their papers, knowledge and professional experience. All that is included in the series of Proceedings volumes, summarizing 289 scientific papers, all of very high quality. The recommendations issued at the end of each workshop are regarded as valuable reference in codification and practice in Europe, the USA and elsewhere.

The 7th Workshop took place from May 30 to June 2, 2012, in the historic city of Timisoara, Romania. The event was hosted by "Politehnica" University and the Romanian Academy, under the supervision of ECCS and AISC. 44 papers were presented by 112 outstanding specialists in structural connections coming from Europe (49) and USA (7), but also from Canada, Brazil, Chile, China and Australia.

Book summary

ECCS published the Connection VII Proceedings, with the final versions of the papers and conclusions. The Proceedings covered six topics: Structural design and design codes; Methods of analysis; Connections for seismic effects; Connections for structures with hollow sections; Bolting and special connection topics; Bracing and truss connections.

At the end of the event, a Concluding Panel, chaired by Prof. Riccardo Zandonini (ECCS) and Dr. Reidar Bjorhovde (AISC) summarized and wrapped up the main contributions collected during oral presentations and open discussions.

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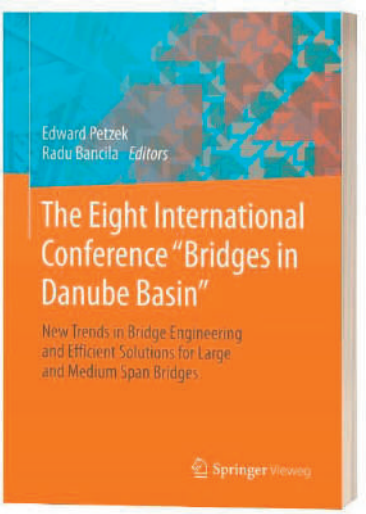
NEW TRENDS IN BRIDGE ENGINEERING AND EFFICIENT SOLUTIONS FOR LARGE AND MEDIUM SPAN BRIDGES

THE EIGHTH INTERNATIONAL CONFERENCE "BRIDGES IN DANUBE BASIN"

(2013)

EDWARD PETZEK, RADU BANCILA (EDS.)

Springer Vierweg
ISBN: 978-3-658-03713-0
DOI: 10.1007/978-3-658-03714-7



Short description of the book

The Danube is an international waterway flowing 2857 km across Europe from the heights of the Schwarzwald massif down into the Black Sea delta. In its passage, the second longest European river crosses 22 geographical longitudes, joining 8 countries: Germany, Austria, Slovakia, Hungary, Serbia, Romania, Bulgaria and Ukraine. The International Conference on Bridges across the Danube has become a traditional international event in bridge engineering, initiated by Prof. Miklos Iványi and organized periodically every three years in different Danube countries: in 1992 on a ship, sailing on the Danube from Vienna via Bratislava to Budapest, in 1995 in Bucharest, in 1998 in Regensburg, in 2001 in Bratislava, in 2004 in Novi Sad, in 2007 in Budapest and in 2010 in Sofia. The Eighth International Conference on Bridges across the Danube took place in Timisoara (Romania) and Belgrade (Serbia) in October 2013 aiming at analysing present trends in bridge construction in every Danube country.

Book summary

The book contains the Proceedings of the 8th International Conference "Bridges in Danube Basin", New Trends in Bridge Engineering and Efficient Solutions for Large and Medium Span Bridges, comprising 44 papers, written by authors from different European countries from the Danube basin.

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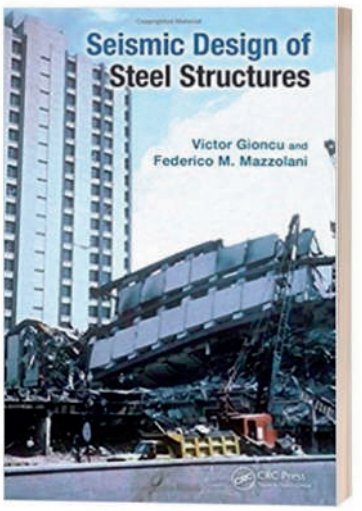
SEISMIC DESIGN OF STEEL STRUCTURES

(2014)

VICTOR GIONCU, FEDERICO M. MAZZOLANI

CRC Press,
imprint of Taylor &Francis Group
ISBN-13: 978-0415242639
ISBN-10: 0415242630



Short description of the book

Providing real world applications for different structural types and seismic characteristics, Seismic Design of Steel Structures combines knowledge of seismic behaviour of steel structures with the principles of earthquake engineering. This book focuses on seismic design, and concentrates specifically on seismic-resistant steel structures.

Drawing on the experience from the Northridge to the Tohoku earthquakes, it combines understanding of the seismic behaviour of steel structures with the principles of earthquake engineering. The book focuses on the global, as well as local behaviour of steel structures and their effective seismic-resistant design. It recognises different types of earthquakes, takes into account the special danger of fire after earthquake, and proposes new bracing and connecting systems for new seismic resistant steel structures, and also for upgrading existing reinforced concrete structures.

- Includes the results of the extensive use of the DUCTROCT M computer program, which is used for the evaluation of the seismic available ductility, both monotonic and cyclic, for different types of earthquakes
- Demonstrates good design principles by highlighting the behaviour of seismic-resistant steel structures in many applications from around the world
- Provides a methodological approach, making a clear distinction between strong and low-to-moderate seismic regions

This book serves as a reference for structural engineers involved in seismic design, as well as researchers and graduate students of seismic structural analysis and design.

Book summary

Chapter 1 Failure of a myth.
1.1. The myth of steel as a perfect material for seismic-resistant structures, 1.2. Behaviour of steel structures during American and Asian earthquakes, 1.3.Behaviour of steel structures during European earthquakes, 1.4.Engineering lessons learned from the last strong earthquakes

Chapter 2 Steel against earthquakes.
2.1. Steel as a material of choice for seismic areas, 2.2. Development of steel structural system

Chapter 3 Challenges in seismic design.
3.1. Gap in seismic design methodologies, 3.2. Earthquake types, 3.3. Strong seismic regions, 3.4. Low-to-moderate seismic regions, 3.5. Proposals for improving the new code provisions

Chapter 4 New generation of steel structures.
4.1. Introduction, 4.2. Improving existing solutions, 4.3. New solutions of bracing systems, 4.4. New solutions for connections

Chapter 5 Advances in steel beam ductility.
5.1. New concepts of structural ductility, 5.2. DUCTROT-M computer program, 5.3. Monotonic available ductility, 5.4. Local ductility under far-field earthquakes, 5.5. Near-field earthquake effects on the available ductility of steel beams

Chapter 6 Fire after earthquake.
6.1. Introduction, 6.2. Structural behavior under the effect of fire, 6.3. Historical events to date, 6.4. Post-earthquake fire and risk management, 6.5. Computational aspects, 6.6. Analysis assumptions, 6.7. Structural behaviour, 6.8. Methodology for assessing robustness, 6.9. Conclusive remarks

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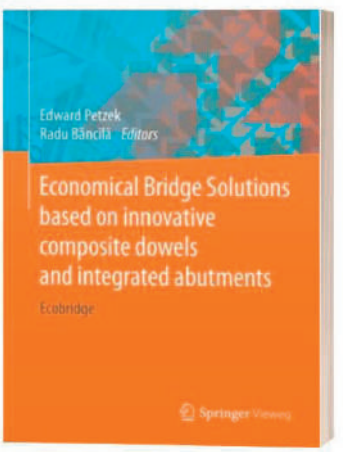
ECONOMICAL BRIDGE SOLUTIONS BASED ON INNOVATIVE COMPOSITE DOWELS AND INTEGRATED ABUTMENTS - ECOBRIDGE



(2015)

EDWARD PETZEK, RADU BANCILA (EDS.)

Springer Vierweg
ISBN: 978-3-658-06416-7
DOI: 10.1007/978-3-658-06417-4

Short description of the book

Bridges are vital structures for transport infrastructure. It is a fact that, in the last decades, composite bridges have become a well-liked solution in many European countries as a cost-effective and aesthetic alternative to concrete bridges. Their competitiveness depends on several circumstances such as site conditions, local costs of material and staff and the contractor's experience. Besides the classical solutions, the new ones with efficient design and construction improve and consolidate the market position of steel construction and steel producing industry. The book contains technical descriptions, construction details, economic aspects and results of monitoring and testing bridge structures that are already executed, implementing composite dowels carried out within the RFCS research project entitled Eco Bridge.

Book summary

This book is an outcome of the research project ECOBRIDGE – Demonstration of ECO-nominal BRIDGE solutions based on innovative composite dowels and integrated abutments – RFCS – CT 2010-00024, which was co-funded by the Research Fund for Coal and Steel (RFCS) of the European Community.

The book comprises 10 contributions:

Demonstration of ECOnomical BRIDGE solutions based on innovative composite dowels and integrated abutments

The right choice of steel according to the Eurocode

Sustainable bridges LCA for composite and concrete bridge

Design of composite dowels as shear connectors according to the German technical approval

Field measurements at a composite bridge with composite dowels as shear connectors

Modern composite bridges by VFTWIB method in Poland realized at new express road S7 at Olsztynek-Nidzica sector

Bridges by VFT method in Poland: state-of-the-art

Renewal of old existing small road bridges with modular system. CASE STUDY Mânărău BRIDGE

Integral bridge using the VFTWIB technology for a threespanned structure

Innovative composite overpasses on the Romanian A1 motorway

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SUSTAINABLE BUILDING PROJECT IN STEEL (B_STEEL)

(2015)

KOUKKARI H., ZUKOWSKA E., CHICA J., ELGUEZABAL P., MENO S., UNGUREANU V., CIUTINA A., DINCA A., GRODZICKA E., CHMIELEWSKI M., GERVASIO H., SANTOS P., SILVA L., BRAGANCA L., ANDRADE J., BANIOTOPOULOS C., ZYGOMALAS I., DEHAN V., VASSART O.

Publications Office of the European Union, Luxembourg
ISBN: 978-92-79-47497-2
DOI: 10.2777/906632

Short description of the book

The main outcome of the SB_Steel project was a pilot software for decision-taking in order to support selection of steel-intensive solutions in the early phases of a building project that are known to be most crucial for the success of the construction work and for the performance and value of the completed building. The 'early design stages' were defined as phases of conceptual design and pre-design that are characterized by lack of precise data and drawings. The piloting web-based service is made available to various operators of the steel construction sector by the European Convention of Constructional Steelwork ECCS. The organisation will promote its development in future.

The R&D tasks of the project supported the development of approaches to steel-intensive new building, renovation and establishing of software:

- to build up a sustainability assessment methodology for a new or renovation building project
- to select a relevant set of key indicators and macro-components applicable for early stages of a building project
- to develop multi-criteria assessment method suitable for an early phase of a building project
- to develop a decision-making platform that supports selection of steel-intensive solutions

- to develop a pilot version of the software based on the combination of key indicators, macrocomponents and decision-taking methodology.

Book summary

The achievements of various work packages and tasks are summarised in the following.

Work Package 1 focuses to gather and preliminarily analyse basic research data concerning the state of the art on several research areas that are related to the sustainable steel-based building projects.

Work Package 2 comprises fundamental steps toward sustainability assessment in the early design stages of a steel-framed and steel-intensive new building.

The Work Package 3 studies applicability of the assessment methods proposed for the early design stages of new building projects to renovation projects, focusing on deep structural renovations and functional upgrading. The word renovation is defined as activities aiming to improve technical, functional or economic value of the building, which are not ordinary maintenance or cleaning. Terms such as improvement, adaptation, upgrading, rehabilitation, modernization, conversion, retrofit, refurbishment and repair are included in this concept. Activities may concern structural, technical or space systems of the building.

Work package 4 provides the decision-making aid for sustainable design of steel-framed and steel-intensive building projects. The software can also be used for renovation design when the building components are presented as macro-components.

Work package 5 runs in parallel with the other work packages by providing architectural and structural design data and drawings and supplying environmental and energy-related data of macrocomponents.

Work Package 6 deals with the dissemination and public consultation concerning the results of the research project.

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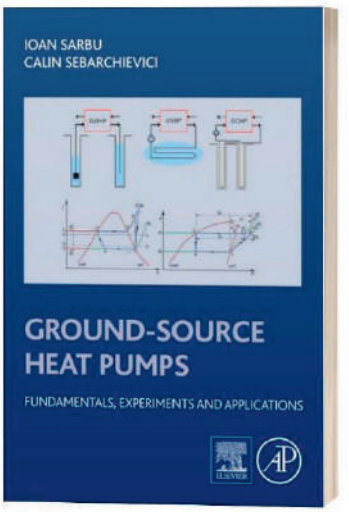
GROUND-SOURCE HEAT PUMPS: FUNDAMENTALS, EXPERIMENTS AND APPLICATIONS

(2015)

IOAN SARBU, CALIN SEBARCHIEVICI

Elsevier, Amsterdam
ISBN: 978-0-12-804220-5
DOI:http://dx.doi.org/10.1016/B978-0-12-804220-5.00001-1



Short description of the book

This book published in 2015 by the famous Elsevier Ltd. treats a modern issue of great current interest at a high scientific and technical level, based both on original research and achievements and on the synthesis of consistent bibliographic material to meet the increasing need for modernisation and for greater energy efficiency of building services to significantly reduce CO2 emissions.

The book mainly presents a detailed theoretical study and experimental investigations on ground source heat pump (GSHP) technology, concentrating on ground-coupled heat pump (GCHP) systems. It also offers a comprehensive and consistent overview of geothermal heat pump applications, performance and combination with heating/cooling systems and covers the technical, economic and energy efficiency aspects related to the design, modelling and operation of these systems. Additionally, the book presents information concerning the characteristics of working refrigerants in mechanical compression heat pumps and specific equipment.

It is remarkable that the book is present in the libraries of the most prestigious universities of the world and is mainly intended for researchers, academics, graduate students, MSc students and PhD students, as well as for industrialists or consultants in this area. Additionally, this book was indexed in the SCOPUS data base.

Book summary

The book is structured into seven chapters.

Chapter 1 summarises a description of renewable energy, concentrating on geothermal energy, and presents the operation principle of a heat pump (HP).

Chapter 2 discusses the vapour compression-based heat pump (VCBHP) systems and describes the theoretical and real thermodynamic cycles and their calculation, as well as the operation regimes of a VCBHP with electro-compressor.

Chapter 3 presents a study on the recent development of possible substitutes for non-ecological refrigerants for heating, ventilating, air conditioning and refrigeration equipment based on thermodynamic, physical and environmental properties and total equivalent warming impact analysis.

Chapter 4 presents a detailed description of the refrigeration compressor types and the HP types. Important information on the selection of the heat source, HP systems and domestic hot water (DHW) production for nearly zero-energy buildings are discussed.

Chapter 5 presents a detailed description of ground characteristics, GSHPs, and GSHP development. It also discusses the most common simulation models and programmes of the vertical ground heat exchangers or borehole heat exchangers currently available, and describes different applications of the models and programmes.

Chapter 6 performs an energy-economic analysis and compares different heating systems in terms of energy consumption, thermal comfort and environmental impact. The energy, economic and environmental performances of a closed-loop GCHP system are analysed and the main performance parameters (energy efficiency and CO2 emissions) of radiators and radiant floor heating systems connected to GCHPs are also compared.

Chapter 7 focuses on the energy and environmental analysis and modelling of a reversible GCHP. One of the main innovative contributions to this study is in the achievement and implementation of an energy-operational optimisation device for the GCHP system using quantitative adjustment with a buffer tank and a variable speed circulating pump. Experimental measurements are used to test the performance of the GCHP system on different operating modes. Finally, two simulation models of thermal energy consumption in heating/cooling and DHW operation were developed using Transient Systems Simulation (TRNSYS) software.

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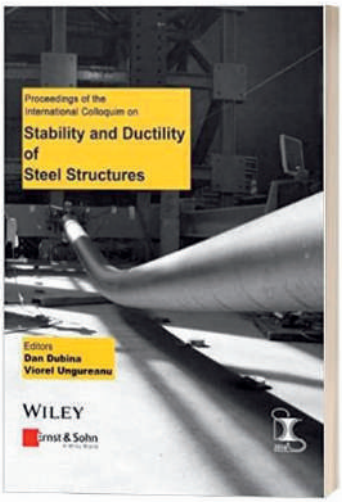
STABILITY AND DUCTILITY OF STEEL STRUCTURES

(2016)

DAN DUBINĂ, VIOREL UNGUREANU (EDS.)

ECCS-European Convention for Constructional Steelwork, Ernst & Sohn
ISBN 978-92-9147-133-1



Short description of the book

The series of International Colloquia on Stability and Ductility of Steel Structures have been supported by the Structural Stability Research Council (SSRC) for quite a long time and are intended to summarise the progress in theoretical, numerical and experimental research in the field of stability and ductility of steel and composite steel-concrete structures. Special emphasis is always given to new concepts and procedures concerning the analysis and design of steel structures and to the background, development and application of rules and recommendations either appearing in recently published Codes or Specifications or about to be included in their upcoming versions.

This International Colloquium series started in 1972, in Paris, and their subsequent editions were taken to several different cities and countries, the last four being held in: Timisoara, Romania (1999), Budapest, Hungary (2002), Lisbon, Portugal (2006) and Rio de Janeiro, Brazil (2010). In October 1982, the Department of Steel Structures and Structural Mechanics of Politehnica University of Timisoara organised one of the East-European Session of the SSRC International Colloquium on Stability of Steel Structures. Since 1992, two series of worldwide recognised scientific events have started from Timisoara, i.e.: CIMS conferences dedicated to Coupled Instability in Steel Structures and, in 1994, the series of STESSA conferences dedicated to Steel Structures in Seismic Areas. Moreover, in 1999 the Department organised the SDSS conference, within the SSRC series dedicated to the Stability and Ductility of Steel Structures. The 6th edition of International Conference on Thin-walled Structures - ICTWS 2011, was also organised in Timisoara, Romania, between 5-7 September 2011. The 2016 edition of SDSS was jointly organised by the Department of Steel Structures and Structural Mechanics, Politehnica University of Timisoara, in co-operation with the Romanian Academy, Timisoara

Branch. It took place with the support of European Convention of Constructional Steelwork (ECCS), through Structural Stability Technical Committee (TC8), and by SSRC.

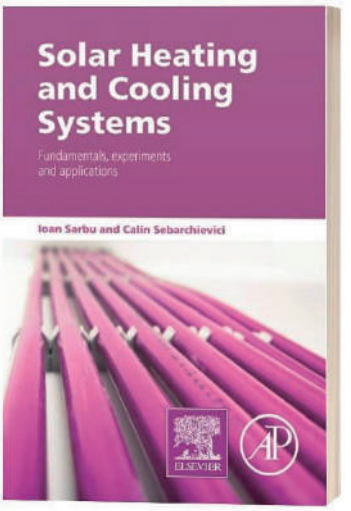
Book summary

The topics to be addressed during the Colloquium include, among others:

Advanced structural analysis, Bridges and footbridges, Cold-formed members, Connections, Cyclic and blast loading, Damage repair and assessment of steel structures, Design codes and standards, Dynamic behaviour and analysis, Fatigue and fracture mechanics, Fire engineering, Frames, High strength & stainless steel, Innovative structural designs and applications, Lightweight aluminium structures, Lightweight fibre reinforced plastic composite structures, Members' behaviour: tension, compression, beams, beam-columns, Off-shore structures, Plate, shell and space structures, Seismic-resistant structures, Reliability and safety, Robustness, Ship structures, Steel-concrete composite members and structures, Thin-walled construction, Trusses, towers and masts, Tubular construction, Vehicle structures.

36

SOLAR HEATING AND COOLING SYSTEMS: FUNDAMENTALS, EXPERIMENTS AND APPLICATIONS



(2017)

IOAN SARBU, CALIN SEBARCHIEVICI

Elsevier, Amsterdam
ISBN: 978-0-12-811662-3
DOI: http://dx.doi.org/10.1016/B978-0-12-811662-3.00001-3

Short description of the book

This book published in 2016 by the famous Elsevier Ltd. provides a comprehensive coverage of emerging solar technologies and applications from a highly scientific and technical level. This study is based on original research and on the synthesis of consistent bibliographic material in order to meet the increasing need for modernisation and greater energy efficiency (to significantly reduce CO2 emissions).

The book mainly presents a comprehensive overview of all major solar energy technologies together with fundamentals, experiments, and applications of solar heating and cooling systems. The book also explores technical, economic, and energy saving aspects related to design, modelling, and operation of these systems. This reference includes physical and mathematical concepts developed to make this publication a self-contained and up-to-date source of information for all those interested in the use of solar energy as an alternative energy source.

It is remarkable that the book is present in the libraries of the most prestigious universities of the world and provides a useful source of information and basis for extended research for all those involved in the field, whether as graduate student, MSc student and also PhD student, academic, scientific researcher, industrialist, consultant, or government agency with responsibility in the area of solar energy. Additionally, this book was indexed in Web of Science (ISI) database.

Book summary

The book is structured into nine chapters.
Chapter 1 summarises a description of renewable energy sources covering some general aspects of regional policies and presents the necessity for using solar energy in heating/cooling of buildings and domestic hot-water (DHW) production.
Chapter 2 presents the main characteristics of solar energy and exposes a methodology for calculating and predicting solar radiation including the main computation elements.
Chapter 3 provides a detailed description of energy balance for solar collector and of different types of solar thermal and photovoltaic (PV) collectors including the calculation of their efficiency and new materials for PV cells. Additionally, a brief overview of the hybrid PV/thermal collector systems is presented.
Chapter 4 focuses on the analysis of thermal energy storage technologies. Sensible heat storage technologies, including the use of water, underground and packed-bed are briefly reviewed, and latent heat storage systems associated with phase change materials and thermo-chemical heat storage are also presented.
Chapter 5 provides a description of main types of solar space and water heating systems and also focuses on active and combisystems. Additionally, valuable information on the solar district heating and solar energy use for industrial applications is provided.
Chapter 6 presents the heat distribution systems in buildings, including hot-water radiators, radiant panels and room air heaters. A mathematical model for numerical modelling of the thermal emission at radiant floors is developed and experimentally validated, and a comparative analysis of the performances for floor, wall, ceiling and floor-ceiling heating is performed using TRNSYS software.
Chapter 7 provides a detailed review of different solar thermal-driven refrigeration and cooling systems. The main aim of this chapter is to give an overview of the state of the art of the sorption and thermo-mechanical technologies that are available to deliver cooling from solar energy.
Chapter 8 covers solar electric cooling systems including the solar PV and thermoelectric systems. Additionally, the chapter presents the details referring to thermoelectric cooling parameters and focuses on the development of thermoelectric cooling systems with particular attention on advances in materials and modelling approaches, and applications.
Chapter 9 presents the operation principle of a heat pump (HP), discusses the vapour compression-based HP systems, and describes the thermodynamic cycle and their calculation. Additionally, the operation principle and calculation of the thermodynamic cycle for a solar-assisted absorption HP are also briefly analysed.

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DESIGN OF STEEL STRUCTURES FOR BUILDINGS IN SEISMIC AREAS

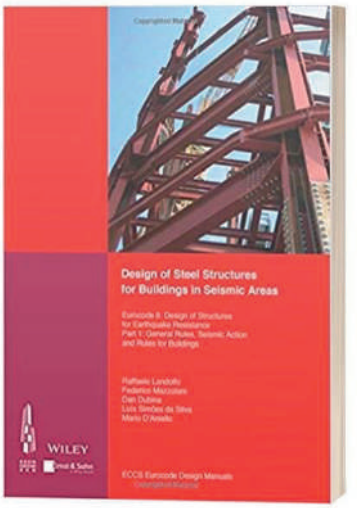
EUROCODE 8: DESIGN OF STRUCTURES FOR EARTHQUAKE RESISTANCE

PART 1-1 – GENERAL RULES, SEISMIC ACTIONS AND RULES FOR BUILDINGS

(2012)

RAFFAELE LANDOLFO, FEDERICO MAZZOLANI, DAN DUBINA, LUIS SIMOES DA SILVA, MARIO D'ANIELO

ECCS – European Covention for Constructional Steelwork Ernst & Sohn, A Wiley Company, Berlin
ISBN: 9783433030103
DOI: 10.1002/9783433609194



Short description of the book

There are many seismic areas in Europe. As times goes by, regional seismicity is better known and the number of places where earthquake is an action to consider in design increases. Of course, there are substantial differences in earthquake intensity between various regions and the concern is much greater in many areas of Italy, for instance, than in most places in Northern Europe. However, even in Northern Europe, for structures where a greater level of safety is required, like Seveso industrial plants, hospitals and public safety facilities, seismic design can be the most requiring design condition.

Designing for earthquake has original features compared to design for classical loading like gravity, wind or snow. The reference event for Ultimate Limit State seismic design is rare enough for an allowance to permanent deformations and structural damages, as long as people's life is not endangered. This means that plastic deformations are allowed at ULS, so that the design target becomes a global plastic mechanism. To be safe, the latter requires many precautions, on global proportions of structures and on local detailing. The seismic

design concepts are completely original in comparison to static design. Of course, designing for a totally elastic behaviour even under the strongest earthquake remains possible but, outside of low seismicity areas, this option is generally left aside because of its cost.

This book is developed with a constant reference to Eurocode 8 or EN 1998-1:2004; it follows the organisation of that code and provides detailed explanations in support of its rather dry expression. Of course, there are many other seismic design codes, but we must emphasise that nowadays there is a strong common belief on the principles and the application rules in seismic design, so that this book is also a support for the understanding of other continents' codes.

The concepts, design procedures and detailing in seismic design, may seem complex. This publication explains the background behind the rules, which clarify their objectives. Details on the design of the different building typologies are given, with reference to international practice and to recent research results. Finally, design examples and real case studies set out the design process in a logical manner, giving practical and helpful advice.

This book will serve the structural engineering community in expanding the understanding and application of seismic design rules; therefore, it constitutes a precious tool for our societies' safety.

Book summary

A brief summary of the book is presented below:

Chapter 1 explains the principles of seismic design and their evolution throughout time, in particular the meaning, goals and conditions set forward by capacity design of structures and their components, a fundamental aspect of seismic design.

Chapter 2 explains the general aspects of seismic design: seismic actions, design parameters related to the shape of buildings, models for the analysis, safety verifications. Analysis methods are explained in an exhaustive way: theoretical background, justifications of limits and factors introduced by the code, interest and drawbacks of each method, to which we occasionally add some tips to facilitate model making and combination of load cases.

Chapter 3 focuses on design provisions specific to steel structures: ductility classes, requirements on steel material, structural typologies and design conditions related to each of them; an original insight on design for reparability is also included.

Chapter 4 provides an overview on the best practice to implement the requirements and design rules for ductile details, particularly for connections in moment resisting frames (MRF), concentrically braced frames (CBF) and eccentrically braced frames (EBF), and for other structural components like diaphragms.

Chapter 5 describes the guidance provided for design assisted by testing by EN 1990 and the specific rules for tests, a necessary tool for evaluating the performance characteristics of structural typologies and components in the plastic field and in cyclic/dynamic conditions.

Chapter 6 illustrates and discusses the design steps and verifications required by EN 1998-1 for a multi-storey Moment Resisting Frame.

Chapter 7 and 8 do the same respectively for buildings with CBFs and EBFs.

Chapter 9 presents three very different examples of real buildings erected in high seismicity regions: one tall building, one industrial hall and one design using base isolation. These examples are complete in the sense that they show the total design, where seismic aspects are only one part of the problem. These examples are concrete, because they illustrate practical difficulties of the real world with materials, execution or positioning.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.2. ELECTRICAL ENGINEERING, ELECTRONICS ,TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES
1.2.1. ELECTRICAL ENGINEERING

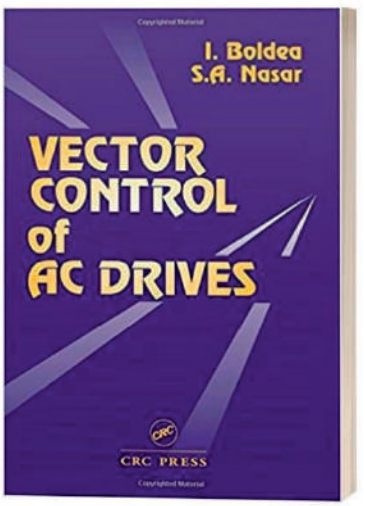
38

VECTOR CONTROL OF AC DRIVES

(1992)

ION BOLDEA AND SYED NASAR

CRC Press
ISBN 978-0-8493-4408-4



Short description of the book

Alternating current (AC) induction and synchronous machines are frequently used in variable speed drives with applications ranging from computer peripherals, robotics, and machine tools to railway traction, ship propulsion, and rolling mills. The notable impact of vector control of AC drives on most traditional and new technologies, the multitude of practical configurations proposed, and the absence of books treating this subject as a whole with a unified approach constituted the driving forces behind the creation of this book.

Vector Control of AC Drives examines the remarkable progress achieved worldwide in vector control from its introduction in 1969 to current technology. The book unifies the treatment of the induction vector control and synchronous motor drives using the concepts of general flux orientation, the feed-forward (indirect), feedback (direct) voltage and current vector control. The concept of torque vector control is also introduced and applied to all AC motors. AC models for drive applications developed in complex variables (space phasors), both for induction and synchronous motors, are used throughout the book. Numerous practical implementations of vector control are described in considerable detail, followed by representative digital simulations and test results taken from recent literature.

Vector Control of AC Drives will be a welcome addition to the reference collections of electrical and mechanical engineers involved with machine and system design.

Book summary

Chapter 1 – "Introduction": Electric drive topology, Motor-load dynamics and stability, typical load torques, Multiquadrant operation converters AC motors, Performance indexes of modern electric drives, Vector controllers, Control robustness and Vector control and AC Drives.

Chapter 2 –"AC motor models for drive applications": the phase variable model of induction machine and synchronous machines, Complex variable model of IM, the dq model of IM and SM, Effects of saturation IM and SM.

Chapter 3 – "Fundamentals of IM control": general flux control, Vector current control, Vector voltage control, Constant air-gap flux operation, constant rotor flux operation, constant stator flux operation.

Chapter 4. "Vector control of voltage-source inverter-fed IM drive": indirect rotor flux orientation current control, respectively vector voltage control, robust rotor flux estimation for direct vector control, airgap flux orientation-vector current control, direct stator flux control, torque vector control.

Chapter 5 "Vector control of current-source inverter-fed IM drives": Indirect rotor flux oriented vector control and torque vector control.

Chapter 6 – "Vector control of SM": synchronous machine equations, variable and constant angle control, vector current control, steady state operation at constant d axis current or given stator flux.

Chapter 7 –"Vector control of permanent magnet SM drives": indirect vector d-q current, indirect vector voltage and torque control.

Chapter 8 – "Voltage control of voltage-source inverter fed reluctance SM drives": dq-Current angle and torque vector control.

Chapter 9 –"Vector control of cycloconverter-fed SM drives": the stator flux oriented control and torque vector control.

Chapter 10-"Vector control of current source inverter-fed motor drive": indirect vector current control, steady state operation with load commutation, digital simulation and test results.

39

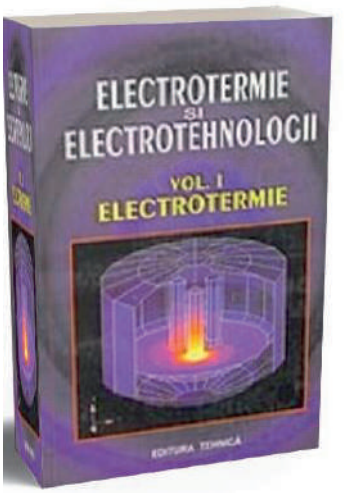
ELECTROTERMIE ŞI ELECTROTEHNOLOGII

[ELECTROTHERMY AND ELECTROTECHNOLOGY] (VOLUMES I AND II)

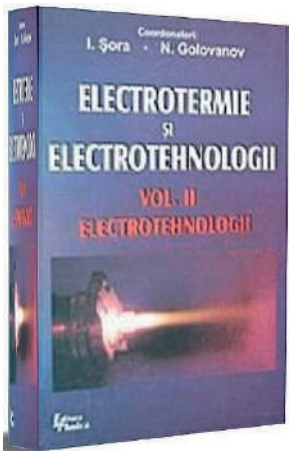
(1999)

IOAN ŞORA, NICOLAE GOLOVANOV (COORD.)

Editura Tehnică, Bucureşti
ISBN 973-31-1144-9



Short description of the books



The first volume of the work presents the technologies based on the conversion of electrical energy into thermal energy, as well as the basic equipment required. The book analyses the conversion principles, the corresponding mathematical models, the parameters of the electrical energy consumption, and the methods that limit the supply network distortions. The modern solutions for the development and optimisation of the electrothermal processes are also emphasised.

The second volume focuses on the analysis of some special modern electrical technologies, which are widely used in industrial processes. The main topics analyse: the efficient usage of fundamental physical phenomena specific to industrial electrotechnologies in order to obtain better performance regarding process control, advanced power control by means of power electronics and reduced energy consumption, and electromagnetic interference.

Both volumes are the result of the co-operation between the members of a very large researcher team from the Romanian technical universities of Bucharest, Timişoara, Cluj-Napoca, Iaşi, Craiova, and from the Moldavian Technical University of Chişinău, as well. The books were rewarded with the "Constantin Budeanu" award given by the Romanian Academy for the year 1999.

Summary of the two volumes

The content of the first volume: 1. General energetic characterisation of the electrothermal equipment. 2. Materials for the electrothermal equipment and installation. 3. Heat transfer mechanisms and temperature measurement. 4. Resistance heating installations. 5. Electrical arc heating. 6. Electromagnetic induction heating. 7. Dielectric heating processes and equipment.

The content of the second volume: 8. General characteristics of special (non-conventional) electrotechnologies. 9. Electrical discharge machining processes and equipment. 10. Electrochemical industrial processes and equipment. 11. Electron beam processing. 12. Laser beam processing. 13. Ultrasonic activation processing and equipment. 14. Plasma beam processing and equipment. 15. Electrical welding processes and equipment. 16. High intensity electric and magnetic field processing.

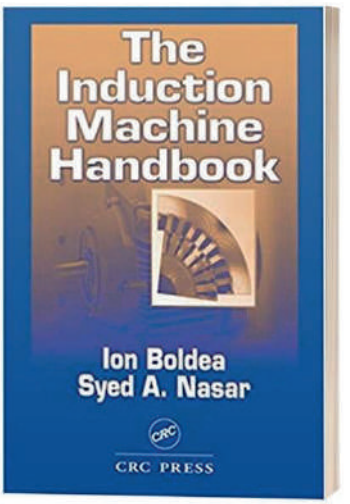
40

THE INDUCTION MACHINE HANDBOOK

(2002)

ION BOLDEA, SYED NASAR

CCRC Press
ISBN 978-0-8493-0004-2



Short description of the book

Often called the workhorse of industry, the advent of power electronics and advances in digital control are transforming the induction motor into the racehorse of industrial motion control. Now, the classic texts on induction machines are nearly three decades old, while more recent books on electric motors lack the necessary depth and detail on induction machines.

The Induction Machine Handbook fills industry's long-standing need for a comprehensive treatise embracing the many intricate facets of induction machine analysis and design. Moving gradually from simple to complex and from standard to new knowledge, it includes an extended presentation of windings' parameters as influenced by frequency and saturation, offers a complete account of standard and new testing methods, and devotes several chapters to the design of variable-speed induction motors. With a coherence and consistency not attainable in contributed works, this handbook draws on the authors' long experience in the field and takes full advantage of its rich literature. The presentation of all types of induction machines together with many numerical examples, digital simulations, and design sample cases make the Induction Machine Handbook a comprehensive, up-to-date resource ideal for both practising engineers and engineering students.

Book summary

Electric energy is produced with synchronous generators, but for the flexible, distributed, power systems of the near future, the induction machine as an electric generator/motor at variable speeds is gaining more and more ground. On the other hand, the induction motor

is the workhorse of industry due to its ruggedness, low cost, and good performance when fed from the standard a.c. power grid.

While in constant speed applications the main challenges are better efficiency and lower costs, in variable speed drives the newly added performance indexes are motion control response quickness, robustness, and precision together with wider speed and power ranges.

This book treats in 28 chapters a wide spectrum of issues such as induction machine applications, principles and topologies, materials, windings, electric circuit parameter computation, equivalent circuits (standard and new) and steady state performance, starting and speed control methods, flux harmonics and parasitic torques, skin and saturation effects, fundamental and additional (space and time harmonics) losses, thermal modelling and cooling, transients, specifications and design principles, design below 100 kW, design above 100 kW, design for variable speed, design optimisation, three-phase induction generators, linear induction motors, super-high-frequency modelling and behaviour of IMs, and testing of three-phase induction machines and single phase IMs.

Numerical examples, design case studies, and transient behaviour waveforms are presented throughout the chapters to make the book self-sufficient and easy to use by the young or experienced readers from academia and industry.

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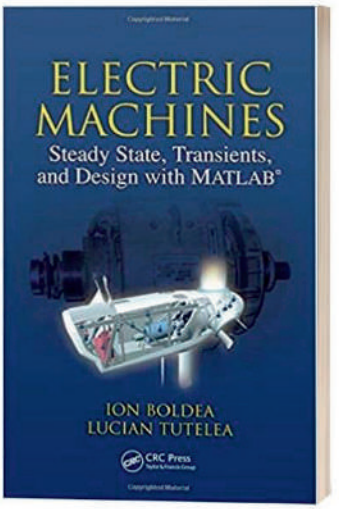
ELECTRIC MACHINES: STEADY STATE, TRANSIENTS, AND DESIGN WITH MATLAB®

(2010)

ION BOLDEA, LUCIAN TUTELEA

CRC Press
ISBN 978-1-4200-5572-6



Short description of the book

Ubiquitous in daily life, electric motors/generators are used in a wide variety of applications, from home appliances to internal combustion engines to hybrid electric cars. They produce electric energy in all electric power plants as generators and motion control that is necessary in all industries to increase productivity, save energy, and reduce pollution.

With its comprehensive coverage of the state of the art, Electric Machines: Steady State, Transients, and Design with MATLAB® addresses the modelling, designing, testing, and manufacturing of electric machines to generate electricity, or in constant or variable-speed motors for motion control. Organised into three stand-alone sections—*Steady State, Transients, and FEM Analysis and Optimal Design*—the book provides complete treatment of electric machines. It also explores international units, contains solved and proposed numerical examples throughout, guides students from simple to more complex math models, and offers a lot of problems with solutions.

The book contains numerous computer simulation programs in MATLAB and Simulink®, available on an accompanying CD-ROM, to help readers make a quantitative assessment of various parameters and performance indexes of electric machines. Skillfully unifying symbols throughout the book, the authors present a great deal of invaluable practical laboratory work that has been classroom-tested in progressively modified forms. This textbook presents expressions of parameters, modelling, and characteristics that are directly and readily applicable for industrial R&D in fields associated with electric machines industry for modern (distributed) power systems and industrial motion control via power electronics.

Book summary

This book aims at covering standard and new electric machines in a comprehensive manner.

It includes several worked out numerical examples and proposed problems with suggestions to find a solution and also 17 MATLAB and Simulink dedicated programs.

Part I Steady State

Chapter 1 introduces the topic and deals with the consumption of electric energy and its applications through electric machines.

Chapter 2 provides comprehensive coverage of single-phase and 3-phase power transformers.

Chapter 3 investigates the energy conversion process in the main types of rotary and linear motion electric machines.

Chapter 4 covers dc and ac brush machines in terms of topology, steady-state modelling, and characteristics in generating/motoring/braking operation modes.

Chapters 5 and 6 provide thorough coverage of topologies, steady-state modelling and performance in various operation modes, and the preliminary design of 3/ 1-phase induction and synchronous with PM and dc-excited rotor machines.

Part II Transients

Chapter 7: Advanced (dq, space phasor) electric machine models for transients.

Chapter 8: DC brush machine transient modelling, transfer functions, and control essentials.

Chapter 9: Synchronous machine transient modelling, transfer functions, and control essentials.

Chapter 10: Induction machine transient modelling, transfer functions, and main control techniques.

Part III FEM Analysis and Optimal Design

Chapter 11: Finite element method essentials and a linear machine case study.

Chapter 12: Finite element method in the analysis of PM synchronous and induction machines with case studies.

Chapter 13: The basics of optimal design methodologies for electric machines.

Chapters 14 and 15: Optimal design of PM synchronous and induction machines with Hooke-Jeeves and genetic algorithms, respectively, along with case studies.

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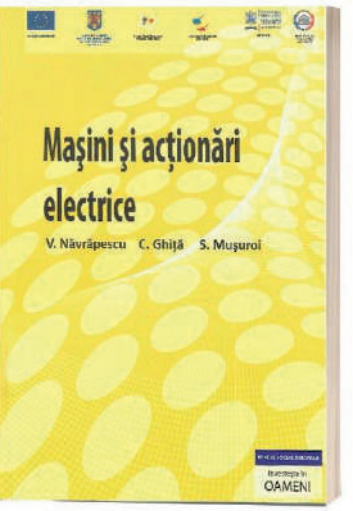
MAŞINI ŞI ACŢIONĂRI ELECTRICE

[ELECTRIC MACHINES AND DRIVES]

(2011)

VALENTIN NĂVRĂPESCU, CONSTANTIN GHIŢĂ, SORIN MUŞUROI

Academy of Sciences Publishing House
ISBN 978-606-8371-39-9



Short description of the book

The book deals with the fundamental problems of electric machines used in electric drives, the main phenomena that occur in modern electric machines and drives, as well as the actual trends towards which the studies and practical or technological achievements are driven.

The book describes the fundamentals of electric machines and electric drive systems in synthetic manner. It treats the concepts of electromechanical energy conversion, the constructive elements, the operating equations and the main characteristics for each of the following: electric transformers, DC and AC machines as well as electric drive systems, including also all their controls, incorporated together in a modern drive system.

Problems specific to electric drives with brushless synchronous motors or stepper motors receive special attention. For a clear understanding of the presented material and for illustrating specific issues, the book contains a number of numerical applications highlighting the way the base systems are treated.

The book content is very dense and contains the fundamental elements regarding the topics addressed. The book's graphical part is very suggestive and helps to better understand the topics presented.

The book addresses both high school students, post-graduate students and university professors in the field of electrical engineering, and also students completing their studies in this field.

Book summary

The introduction deals with the concepts of electromechanical energy conversion as well as the electric machines' operating modes. Chapter 2 treats the electrical transformer. The constructive elements of the transformers, their operating equations as well as the computation elements of the low power single-phase transformers are presented. In the third chapter the AC asynchronous and synchronous machines are presented synthetically. The chapter addresses problems related to the magnetic field in AC machines, their construction, operating principle, characteristics and modern trends regarding induction and synchronous motors. In Chapter 4, DC machines are discussed thoroughly. Constructive elements, actual trends, DC machines with excitation (epated, derivated and series) are just a few of the issues covered by this chapter. The next two chapters deal with the problems the electric machines confront with in renewable sources and electric drive systems. Chapter 7 presents DC electric drives. It describes the main problems related to starting, braking and speed control of the DC machine. Issues related to whether the DC power supply should be made from a natural commutated converter or a forced commutated converter are also discussed. Chapter 8 is dedicated to the induction motors scalar control. The last chapter focuses on the questions raised inside the brushless synchronous and stepper motor drives. Fundamental aspects related to the open-loop control, field-oriented vector control, direct torque and flux control of permanent magnets synchronous motors are highlighted. Finally, the chapter treats electric drive systems with stepper motors.

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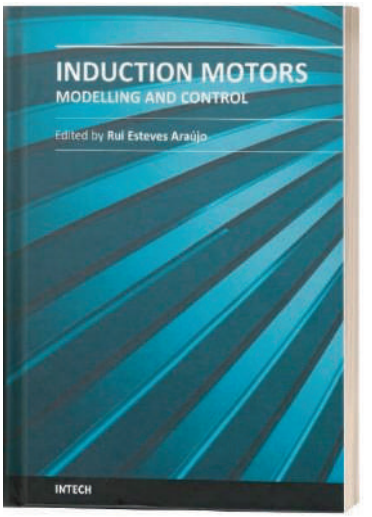
THE BEHAVIOUR IN STATIONARY REGIME OF AN INDUCTION MOTOR POWERED BY STATIC FREQUENCY CONVERTERS



(2012)

SORIN MUŞUROI

BOOK CHAPTER PUBLISHED IN INDUCTION MOTORS. MODELLING AND CONTROL

SORIN RUI ESTEVES ARAUJO (ED.)
InTech
ISBN 978-953-51-0843-6

Short description of the book

Induction motor research has a long and distinguished tradition stretching back to the end of the nineteenth century with the pioneering works of Nikola Tesla. Its establishment as the main type of electric motor used in electric drives in the 1990th arose, essentially, following the early works of Blaschke and Hasse on Field-Oriented Control methods by, among others, Professor Leonhard and Lipo. All this has been increasingly underpinned by rapid developments in computing capability and power electronics. Modern variable-speed drives rely on sophisticated control systems to meet increased performance and communication requirements. Presently, the variable-speed drives with induction motor remain the dominant market leader in a large range of industrial applications.

In broad terms, the electromechanical energy conversion can occur by the interaction of electromagnetic fields and material bodies in motion. The task of an induction motor is to produce motive force, which can be controlled by power electronic converters with digital controllers to implement modern variable-speed drives. Historically, from the point of view of practical applications, a significant amount of research on induction motor drives was motivated by industrial applications. The book aims at providing the readers with a deep discussion about relevant topics in the area of induction motor drives. There are several good books in the area of electrical drives. At the same time, as a result of the increasing interest raised by the topic, a large number of technical and methodological papers have appeared in

the technical literature. However, this book takes on from these cited works and hopefully makes its own contribution to the literature of induction motors.

The book contains twenty-one chapters, which are authored by international researchers in the field from Europe, South America, Japan and the USA. The book is organised into two parts. The first part presents different views about mathematical description in terms of which transient states of an induction machine are analysed, explores some topics related to the design of the induction machine, and also explores some topics related to design of the induction motor and its applications. This part ends with a chapter on how to identify the induction motor parameters using a least-squares technique. The second part covers the control of the induction motors presenting both field-oriented techniques and nonlinear control methods. The direct torque control and sensorless methods are also presented, along with simulations results. The last chapter addresses the problem of how to detect induction motor faults. Particularly, it discusses the use of direct spectral analysis of stator current to find rotor faults, which has important practical applications.

Chapter summary

Chapter 2. The Behaviour in Stationary Regime of an Induction Motor Powered by Static Frequency Converters, Sorin Muşuroi

Generally, the electric induction motors are designed for supply conditions from energy sources in which the supply voltage is a sinusoidal wave. The parameters and the functional sizes of the electric motors are guaranteed by designers for the motor only. The values of the nominal sizes are indicated in the catalogues of the electric machine producing companies for the nominal voltage and working frequency.

If the electric motor is powered through an inverter, due to the presence in the input voltage waveform in the motor of superior time harmonics, both its parameters and its functional characteristic sizes will be more or less different from those in the case of the sinusoidal supply. The presence of these harmonics will result in the appearance of a deforming regime in the machine, generally with adverse effects in its operation. Under loading and speed conditions similar to those in the case of the sinusoidal supply, an amplification of the losses of the machine, of the electric power absorbed and thus a reduction in efficiency are registered. There is also a greater heating of the machine and an electromagnetic torque that at a given load is not invariable, but pulsating, in rapport with the average value corresponding to the load.

The occurrence of the deforming regime in the machine is inevitable, because any inverter produces voltages or printed currents containing, in addition to the fundamental harmonic, superior time harmonics of odd order. The deforming regime in the electric machine is unfortunately reflected in the supply power grid that powers the inverter.

So far, the research has mostly focused on the inverter part. We analysed its power and got good results by using the IGBT transistors as power semiconductor elements, while on the control part, the results were obtained by using various modern control techniques. Regardless of the wiring diagrams and control strategies considered, we obtained only an attenuation of the deforming regime, without its elimination.

The present chapter aims at analysing the behaviour of induction motor when supplied through an inverter. The purpose of this study is to develop the theory of three-phase induction machine with a squirrel cage, under the conditions of the non-sinusoidal supply regime to serve as a starting point in improving the methodology of its constructive-technological design as advantageous economically as possible.

The analysis of the induction machine behaviour and the assessment of its performance in stationary regime, when the motor is powered through the inverter focuses mainly on Fourier's analysis use. The main advantages of the method are its simplicity and the possibility of using the calculus relations from the designing of the electric motors for the sinusoidal regime in many cases.

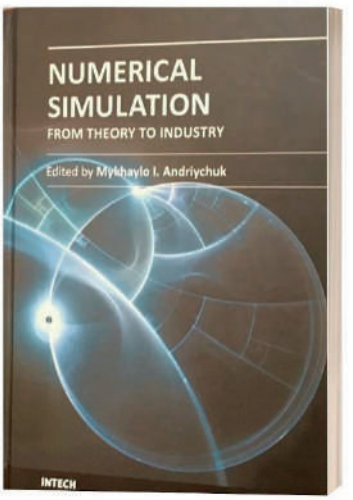
Using this approaching method requires as a simplifying hypothesis that the variable magnetic saturation should be neglected. This hypothesis does not distort too much the reality as the present study aims mainly to analyse the non-sinusoidal stationary regime of the machine at a load practically equal to the nominal one, in which the saturation degree has a determined value. In this situation, the value of the current that occurs is not very different from the value of the basic sinusoidal current. This hypothesis remains valid even under the start conditions, when using the procedures for reducing the starting current known in literature.

This chapter aims to achieve the following operational objectives:

- establishing a unique mathematical model associated to the induction machine powered through inverters that can describe the operation of the motor under the conditions of the presence of all superior time harmonics in their power supply;
- the analysis of the skin effect for induction machines powered through inverters and establishing the expressions of the equivalent global factors corresponding to this situation;
- determining the equivalent parameters of the windings of the induction motor powered through inverters by considering the skin effect;
- the analysis of the losses under the conditions of the non-sinusoidal supply.

44

NUMERICAL METHODS FOR ANALYZING THE TRANSIENTS IN MEDIUM VOLTAGE NETWORKS



(2012)

DUMITRU TOADER, STEFAN HĂRAGUȘ, CONSTANTIN BLAJ

BOOK CHAPTER PUBLISHED IN NUMERICAL SIMULATION FROM THEORY TO INDUSTRY

MYKHAYLO I. ANDRIYCHUK (ED.)
INTECH
ISBN : 978-953-51-0749-1
DOI: 10.5772/2600

Short description of the book

This book contains original and innovative research studies related to modelling and simulation of the physical phenomena in a very wide range of applications, including the macro- and micro-electrodynamics radiation and scattering, the fluid dynamics turbulence and emulsification, as well as the various industrial processes. Recent numerical techniques, as well as the most accurate and advanced software are applied in order to perfectly explain the nature of the considered phenomena. The book can be useful for theoretical and applied researchers, who deal with numerical simulation in various areas of science. The book chapters are divided into four sections according to the considered problems and corresponding areas of application. Section 1 contains the latest advances in the bifurcation theory, network scheduling, epidemiology, physics of plasma, and mechanics. Section 2 contains the numerical simulation in electromagnetics and micro-electronics, Section 3 contains fluid dynamics and Section 4 contains industrial applications. The book addresses all researchers, not only those in the field of fundamental engineering sciences, who use numerical methods in the analysis of physical phenomena.

Book summary

Chapter 2. Model-Based adaptive tracking control. Chapter 3 Issues on communication network control system based upon scheduling strategy using numerical simulation. Chapter 5. Charge separation an electric field at a cylindrical plasma edge. Chapter 6. Recent developments on compton scatter tomography: Theory and numerical simulations. Chapter 7. Numerical simulation of Slip-Stick elastic contact. Chapter 8. Numerical simulation of radiation and scattering characteristics of dipole and LOOP antennas. Chapter 9. Synthesis to antenna systems according to the desired amplitude radiation characteristics. Chapter 10. A Numerical study of amplification of space charge waves in n-InP films. Chapter 11. Accuracy investigation of De-Embedding techniques based on electromagnetic simulation for on-wafer RF measurements. Chapter 12. Analytical model and numerical simulation for the transconductance and Drain.conductance of GaAs MESFETs. Chapter 13. Using numerical simulations to study and design semiconductors devices in micro and nanoelectronics. Chapter 14. Numerical simulation of passively Q-Switched solid-state lasers. Chapter 15. Soft-Error rate of advanced SRAM memories: Modelling and Monte Carlo simulation. Chapter 16. BG Model based on Bagnold's concept and its application to analysis of elongation of sand spit and shore-normal sand bar. Chapter 17. Numerical simulations of water wave are modelling instability under the action of wind and dissipation. Chapter 18. Spectral modelling and numerical Simulation of Compressible Homogeneous Sheared Turbulence. Chapter 19. Numerical simulation of droplet dynamics in membrane emulsification systems. Chapter 20. Numerical methods for analyzing the transients in medium voltage networks.

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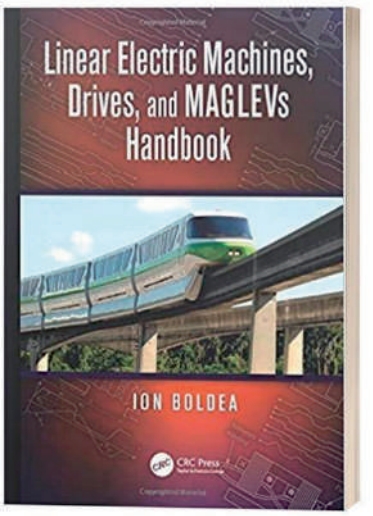
LINEAR ELECTRIC MACHINES, DRIVES, AND MAGLEVS HANDBOOK

(2013)

ION BOLDEA

CRC Press
ISBN 978-1-4398-4514-1



Short description of the book

Linear Electric Machines, Drives, and Maglevs Handbook provides a practical and comprehensive resource to the steady improvement in this field. The book presents in-depth reviews of basic concepts and detailed explorations of complex subjects, including classifications and practical topologies, with sample results based on an up-to-date survey of the field.

Packed with case studies, this state-of-the-art handbook covers topics such as modelling, steady state, and transients as well as control, design, and testing of linear machines and drives. It includes discussion of types and applications—from small compressors for refrigerators to MAGLEV transportation—of linear electric machines. Additional topics include low and high-speed linear induction or synchronous motors, with and without PMs, with progressive or oscillatory linear motion, from topologies through modelling, design, dynamics, and control.

With a breadth and depth of coverage not found in currently available references, this book includes formulae and methods that make it an authoritative and comprehensive resource for use in R&D and testing of innovative solutions to new industrial challenges in linear electric motion/energy automatic control.

Book summary

Linear electric (electromagnetic) machines (LEMs) make the conversion of electrical energy to linear motion mechanical energy (or vice versa) directly, through electromagnetic forces.

Chapter 1: Fields, forces, and materials for LEMs;

Chapter 2: Classifications and applications of LEMs;

Chapter 3: Linear induction motors: topologies, fields, forces and powers including edge, end and skin effects;

Chapter 4: Linear induction motors (LIM): circuit theories, transients and control;

Chapter 5: Design of flat and tubular low speed LIMs;

Chapter 6: Transportation (medium and high speed) design;

Chapter 7: D.C. – excited linear synchronous motors: steady state, design, transients and control;

Chapter 8: Superconducting magnet linear synchronous motor;

Chapter 9: Homopolar linear synchronous motors: modelling, design and control;

Chapter 10: Linear reluctance synchronous motors: modelling, performance design and control;

Chapter 11: Linear switched reluctance motors: modelling, design and control;

Chapter 12: Flat Linear Permanent Magnet Synchronous Motors;

Chapter 13: Tubular Linear Permanent Magnet Synchronous Motors;

Chapter 14: Multi-pole coil 3 (2) phase linear PM reluctance motors;

Chapter 15: Plunger solenoids and their control;

Chapter 16: Linear d.c. PM brushless motors;

Chapter 17: Resonant linear oscillatory single-phase PM motors/generators;

Chapter 18: Multi-axis linear PM motor drives;

Chapter 19: Attraction force (electromagnetic) levitation systems;

Chapter 20: Repulsive force levitation systems;

Chapter 21: Active guideway MAGLEVs;

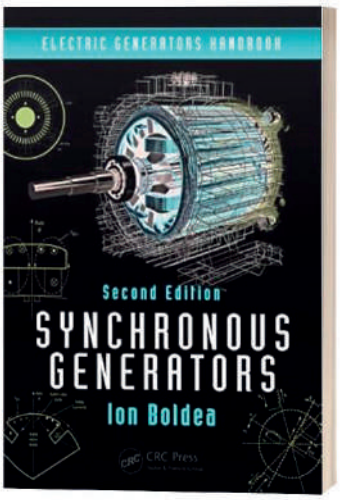
Chapter 22: Passive guideway MAGLEVs.

46 SYNCHONOUS GENERATORS

(2016)

ION BOLDEA

CRC Press
ISBN 978-1-4987-2356-5



Short description of the book

Synchronous Generators, the first of two volumes from the *Electric Generators Handbook*, offers a thorough introduction to electrical energy and electricity generation, including the basic principles of electric generators. The book devotes a chapter to the most representative prime mover models for transients used in active control of various generators. Then, individual chapters explore large- and medium-power synchronous generator topologies, steady state, modelling, transients, control, design, and testing. Numerous case studies, worked-out examples, sample results, and illustrations highlight the concepts.

Fully revised and updated, this Second Edition adds new sections that:

- Discuss high-power wind generators with fewer or no permanent magnets (PMs)
- Cover PM-assisted DC-excited salient pole synchronous generators
- Present multiphase synchronous machine inductances via the winding function method
- Consider the control of autonomous synchronous generators
- Examine additional optimisation design issues
- Illustrate the optimal design of a large wind generator by the Hooke–Jeeves method
- Detail the magnetic equivalent circuit population-based optimal design of synchronous generators
- Address online identification of synchronous generator parameters
- Explain the small-signal injection online technique
- Explore line switching (on or off) parameter identification for isolated grids

- Describe synthetic back-to-back load testing with inverter supply

Synchronous Generators supplies state-of-the-art tools necessary to design, validate, and deploy the right power generation technologies to fulfil tomorrow's complex energy needs.

Book summary

Chapter 1 introduces energy resources and the main electric energy conversion solutions.

Chapter 2 displays a broad classification and the principles of various electric generator topologies, with their power ratings and main applications.

Chapter 3 covers the main prime movers for electric generators, from topologies to basic performance equations and practical dynamic models and transfer functions. Steam, gas, hydraulic, and wind turbines and internal combustion (standard, Stirling, and diesel) engines are dealt with.

Chapter 4 and Chapter 5 address the topic of cage rotor induction generators in self-excited mode in power grid and stand-alone applications, with small speed regulation by the prime mover or with a full rating PWM converter connected to the stator and wide variable speed with ±100% active and reactive power control.

Chapter 6 throughout to Chapter 9 deal with the most representative electric generator systems recently proposed for integrated starter alternators (ISAs) on automobiles, vessel and aircraft, all at variable speed, with full power ratings electronics control.

Chapter 10 deals extensively with radial and axial airgap, surface and interior PM rotor permanent magnet synchronous generators that work at variable speed and make use of full-rating power electronics control. This chapter is directed to wind and hydraulic energy conversion.

Chapter 11 investigates, with numerous design case studies, two high-torque-density PM SGs (transverse flux) and flux switch reversal, introduced in the last two decades to take advantage of multipole stator coils that do not overlap.

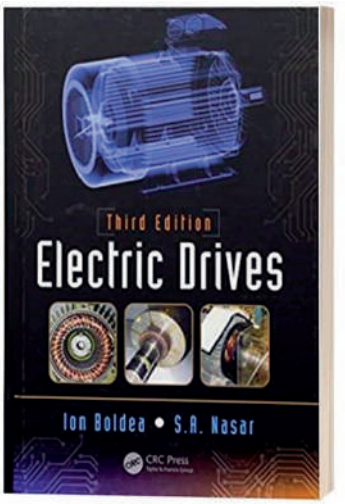
Chapter 12 investigates linear reciprocating and linear progressive motion alternators. Linear reciprocating PMSGs (driven by Stirling free piston engines) were introduced and used recently for NASA mission generators with 50,000 h or more fail-proof operation.

47 ELECTRIC DRIVES

(2017)

ION BOLDEA, SYED NASAR

CRC Press
ISBN 978-1-4987-4820-9



Short description of the book

Electric Drives provides a practical understanding of the subtleties involved in the operation of modern electric drives. The Third Edition of this bestselling textbook has been fully updated and greatly expanded to incorporate the latest technologies used to save energy and increase productivity, stability, and reliability.

Every phrase, equation, number, and reference in the text has been revisited, with the necessary changes made throughout. In addition, new references to key research and development activities have been included to accurately reflect the current state of the art.

Nearly 120 new pages covering recent advances, such as those made in the sensorless control of A.C. motor drives, have been added; two new chapters have also been added on advanced scalar control and multiphase electric machine drives. All solved numerical examples have been retained, and the 10 MATLAB®–Simulink® programs remain online.

Thus, Electric Drives, Third Edition offers an up-to-date synthesis of the basic and advanced control of electric drives, with ample material for a two-semester course at university level.

Book summary

"Electric Drives" was released in 2006 and the authors have quite a few reasons to come up with a 3rd edition, given the steady and strong recent progress in the technology which is related to energy savings and more industrial productivity.

New paragraphs, mainly in the technology of sensorless control of a.c. motor drives have been added: Electric drive Applications, Split – phase capacitor IM transients, Phase variable model, dq model, Predictive control, Single phase PMSM modelling for transients, Wide speed range sensorless control of PM-RSM via active flux, Sensorless control of RSM from zero speed up, Sensorless control of a dc-excited SM via active flux and PMSG sensorless control. Two new Chapters (16, 17) were added to the book. Chapter 16: "Advanced V/f and I-f scalar control of ac drives: an overview" refers to enhanced scalar control of ac drives which, in its basic version, is commercially available on a menu basis in most general variable speed drives, but recently underwent dynamic enhancements that in terms of speed and torque response are almost as performant as FOC and DTFC , in simpler control implementations, though.

Chapter 17, "Multiphase electric motor drives: an overview", targets a rather new technology that seems close to industrialisation, intended mainly for railroad, HEV, EV, wind energy generators, ship propulsion and aircraft auxiliaries. The modelling of multiphase induction, PMSM and BLDC-multiphase reluctance machines and their control, through dedicated PWM multiphase converters, are all treated in this overview Chapter.

There are also 10 Matlab Simulink Programs on the accompanying CD.

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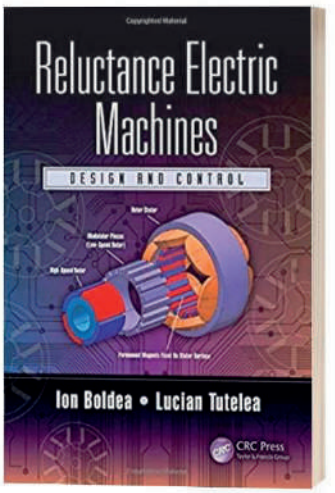
RELUCTANCE ELECTRIC MACHINES: DESIGN AND CONTROL

(2019)

ION BOLDEA, LUCIAN TUTELEA

CRC Press
ISBN: 978-1498782333



Short description of the book

Electric energy is arguably a key agent for our material prosperity. With the notable exception of photovoltaic generators, electric generators are exclusively used to produce electric energy from mechanical energy. More than 60% of all electrical energy is used in electric motors for useful mechanical work in various industries. This book presents the modeling, performance, design, and control of reluctance synchronous and flux-modulation machines developed for higher efficiency and lower cost.

Reluctance motor drives start to find their rightful place in the adjustable speed motor drives. This is in part due to their lower cost, ease of cooling, higher fault tolerance, and suitability for use under harsh operating and ambient condition. The book by Prof. Boldea and Prof. Tutelea offers a physically insightful approach to electromechanical energy conversion in this family of electric machines. The authors provide an in-depth explanation of the electromagnetic performance, interdependence between control and magnetic design and fundamentals of design. This book is a great resource for practicing engineers in industry and researchers in academia. There is an outstanding balance between the theoretical contents and engineering aspects of design and control throughout the manuscript which makes this book an excellent choice for a graduate course in academic institutions or series of short courses for practicing engineers in the industry. This book is highly recommended to researchers and practitioners in the area of electric machines.

Book summary

Though the principle of the variable reluctance motor was patented in the late nineteenth century, it was not until power electronics developed into a mature industry in the 1970s that reluctance electric machines became a strong focus point in R&D and industry. Delayed by the spectacular advent of PM electric machines for a few decades, only in the last 10 years have reluctance electric machines enjoyed increased attention. Very recently, such reluctance synchronous motor drives for variable speeds have reached mass production from 10 kW to 500 kW.

An overview of the recent progress with classifications, topologies, principles, modeling for design, and control is timely, and this is what the present monograph intends to do.

After an introductory Chapter 1, the book is divided into two parts:

Part 1: One- and three-phase reluctance synchronous motors in line-start (constant speed) and then in variable-speed applications, with PM assistance to increase efficiency at moderate extra initial cost and in variable-speed drives (Chapters 2 through 5);

Part 2 includes a myriad of topologies under the unique concept of flux modulation and includes: Claw pole rotor synchronous motors, Chapter 6; Brushless DC–multiple phase reluctance machines, Chapter 7; Brushless doubly fed reluctance machines, Chapter 8; Switched flux PM synchronous machines, Chapter 9; Flux reversal PMSMs, Chapter 10; Vernier PM machines, Chapter 11; Transverse-flux PMSMs, Chapter 12; Magnetic-gear dual-rotor reluctance electric machines, Chapter 13; DC+alternating current (AC) doubly salient electric machines, Chapter 14.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.2. ELECTRICAL ENGINEERING, ELECTRONICS ,TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES
1.2.2. ELECTRONICS

49 POWER QUALITY DATA COMPRESSION

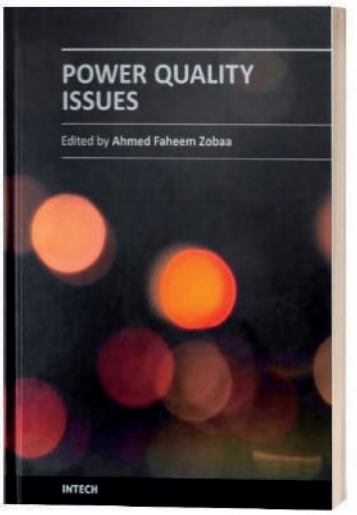
(2011)

GABRIEL GĂȘPĂRESC

BOOK CHAPTER PUBLISHED IN POWER QUALITY ISSUES

AHMED FAHEEM ZOBAA (ED.)

INTECH
ISBN: 978-953-51-1068-2
DOI: 10.5772/3373



Short description of the book

This book on power quality written by experts from industries and academics from various countries will be of great benefit to professionals, engineers and researchers. This book covers various aspects of power quality monitoring, analysis and power quality enhancement in transmission and distribution systems. Given our increasing dependence on technologies, security of the power supply is a matter of the utmost importance. As such, we require cutting-edge and efficient methods of measuring its efficiency and reliability.

With a few decades ago power quality assurance was the ability to deliver electric power without interruptions. The reasons were the reduced number of loads and the absence of the power quality standards. At present, the number of non-linear loads has increased, new devices more sensitive to the electromagnetic disturbances have appeared, the competition on the market is significant, the customers are better informed and their requirements are higher than ever before due to increasing sources of electromagnetic disturbances that occur in power supply networks which affect many industries. Power quality issues have become a major concern, power quality monitoring systems for automatic detection and classification have become an indispensable tool in any industry, and, in time, they have been developed to meet the always higher requirements on the market.

Book summary

This book offers chapters on the compression of power quality data, and methods of recognizing and classifying quality in distribution networks. Other chapters cover using robust symmetrical components' estimation to improve quality in weak grids, monitoring the quality

of small-scale renewable energy and the use of active power conditioners to mitigate power-quality problems. Several chapters cover harmonic effects, such as case studies of bank harmonic filters, a parameter-estimation methodology and high-frequency harmonics emissions in smart grids. Finally, one contribution evaluates the distortion and imbalance of emission levels in electric networks.

A brief summary of the first chapter, Power Quality Data Compression by Gabriel Găşpăresc (Politehnica University of Timişoara), is presented next. In recent years, the results highlighted in the scientific literature show that the most used compression methods in power quality are based on wavelet transform and Slantlet transform. This chapter provides an overview of their applications in power quality signal compression.

A power quality monitoring system provides a huge volume of raw data from different locations, acquired during long periods of time and the amount of data increases daily. The hardware of power quality monitoring systems should have a high sampling rate because the power quality events cover a broad frequency range, starting from a few Hz (flicker) to a few MHz (transient phenomenon). But a high sampling rate leads to a large volume of acquired data which should be transferred and stored. Therefore, data compression is necessary to save storage space and to reduce the communication time.

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STATISTICAL TOOLS AND OPTOELECTRONIC MEASURING INSTRUMENTS

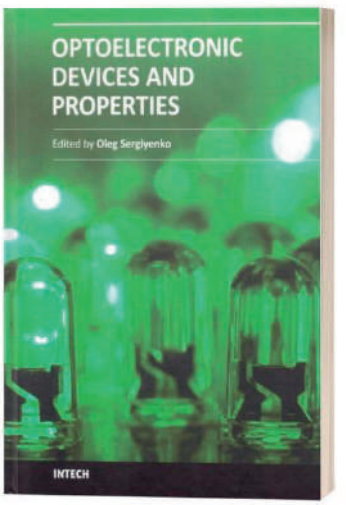
(2011)

SABIN IONEL, IOANA IONEL

BOOK CHAPTER PUBLISHED IN OPTOELECTRONIC DEVICES AND PROPERTIES

OLEG SERGIYENKO (ED.)

INTECH
ISBN: 978-953-307-204-3
DOI: 10.5772/1425



Short description of the book

The purpose of this book is to provide clear, accessible overview of optoelectronic devices, including basic principles as well as a wide range of applications from household to multimedia systems, computing, 2D and 3D vision systems, measurements and medical instrumentation. The book includes recent developments regarding analytical techniques, novel materials and physico-chemical phenomena, analogue and digital links, optical waveguides, nanoscale devices, etc. Fundamental opto-electronic properties of nanowire heterostructures are studied as a class of materials opening opportunities for compact and more powerful systems.

Optoelectronic methods with applications in robot navigation, health monitoring and body scanners are also presented. The interest in optoelectronic measurements in spatial and frequency domains is emphasized. This book refers to both electrical and optical behaviour of optoelectronic devices utilized in a wide range of optical fifer communication and optoelectronic systems.

According to the editor O. Sergiyenko, the book can be „an ideal reference for graduate students and researchers in electrical engineering and applied physics departments". The volume is certainly useful for the engineers working in the optoelectronic industry.

Chapter summary

The book has seven parts covering 660 pages. The first part presents „New Materials in Optoelectronics" with specific applications: molecular electronic devices, organic semiconductor based heterostructures, phototransistors, light-emitting transistors, conducting polymers etc. The second part reveals properties and applications of nanostructures, like ZnO, NbN etc. The third and fourth parts are dedicated to optoelectronic measurements in spatial and frequency domains, respectively. Part five refers to physical modeling and simulations of optoelectronic devices, while in sixth section presents „Laser Devices and Methods". Finally, in the seventh part entitled „Optical Communications", problems of optoelectronic chaotic circuits and optoelectronic feedback in semiconductor light sources are discussed.

The chapter „Statistical Tools and Optoelectronic Measuring Instruments" by Sabin Ionel and Ioana Ionel is based on several air quality measuring campaigns realized in the frame of European research projects. Due to their random character, signals representing CO, NO_2, O_3, SO_2 and HC concentrations, can be analyzed using statistical processing methods. The main statistical functions and parameters taken into account are histograms, correlation coefficients, correlation and covariance functions. Computer experiments lead to practical recommendations concerning acquisition parameters like data size and sampling frequency. As a particular application, the correlative comparison of two carbon monoxide (CO) measuring instruments is presented.

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IMPLEMENTATION OF A CO CONCENTRATION MONITORING SYSTEM USING VIRTUAL INSTRUMENTATION

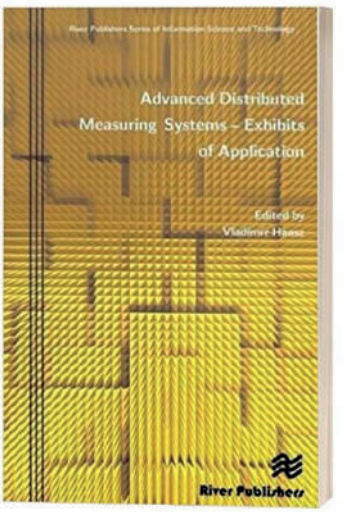
(2012)

RAUL CIPRIAN IONEL, AUREL GONTEAN, PATRICIA GHERBAN-DRAUT

BOOK CHAPTER PUBLISHED IN ADVANCED DISTRIBUTED MEASURING SYSTEMS - EXHIBITS OF APPLICATION

VLADIMIR HAAZ (ED.)

RIVER PUBLISHERS
ISBN 9788792329721



Short description of the book

Measuring systems are an essential part of all automated production systems, they also serve to ensure the production quality or the reliability and safety in various areas. The same applies, in principle, likewise for fields of telecommunication, energy production and distribution, health care, etc. Similarly, no serious scientific research in the field of natural and technical sciences can be performed without objective data about the investigated object, which are usually acquired using measuring system. Demands on the speed and accuracy of measurement increase in all areas in general. These are the grounds for publishing this book.

The book "Advanced distributed measuring systems - exhibits of application" offers 8 up-to-date examples of typical laboratory, industrial and biomedical applications of advanced measuring and information systems, including virtual instrumentation. The technical topics discussed in the book include: embedded applications; small distributed systems; automotive distributed system; distributed monitoring systems based on wireless networks; synchronization in large DAQ systems; virtual instrumentation.

Chapter summary

The technical topics discussed in the book include: embedded applications; small distributed systems; automotive distributed system; distributed monitoring systems based on wireless networks; synchronization in large DAQ systems; virtual instrumentation.

Chapter 7: Implementation of a CO Concentration Monitoring System Using Virtual Instrumentation: The Use of Virtual Instrumentation (VI) is becoming more and more popular when dealing with sensor-based data acquisition and analysis. As a main goal, VI delivers the means to rapidly develop a competitive tool which meets the technical performances of traditional devices. Using customizable software and modular hardware, one can implement applications which are extremely powerful and complex, at the same time having lower costs. Different types of gas sensors are used to implement applications which investigate ambient air pollution levels. Carbon monoxide (CO) concentration measurement is an integral part of dedicated environment monitoring stand-alone specialized systems. This chapter presents an alternative solution for CO concentration monitoring, based on an original virtual instrumentation concept. The advantages of the proposed application include data logging, statistical calculations, remote access or software and hardware flexibility. Comparative experimental results are also provided.

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METHODS OF POWER QUALITY ANALYSIS

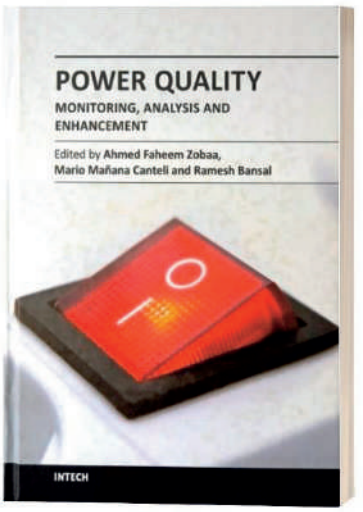
(2015)

GABRIEL GĂȘPĂRESC

BOOK CHAPTER PUBLISHED IN POWER QUALITY MONITORING, ANALYSIS AND ENHANCEMENT

AHMED FAHEEM ZOBAA, MARIO MANANA CANTELI, RAMESH BANSAL (EDS.)

INTECH
ISBN: 978-953-307-330-9
DOI: 10.5772/1425



Short description of the book

This book on power quality written by experts from industries and academics from various counties is of great benefit to professionals, engineers and researchers. This book covers various aspects of power quality monitoring, analysis and power quality enhancement in transmission and distribution systems. Given our increasing dependence on technologies, security of the power supply is of utmost importance. As such, we require cutting-edge and efficient methods of measuring its efficiency and reliability.

In the last decades, electronics and telecommunications have known an unprecedented development. The number of non-linear loads (power electronics) has increased. New more energy efficient devices and equipment, controlled by microprocessors, have appeared. They are also more sensitive to electromagnetic disturbances, produced by neighborhood devices or by the shared infrastructure, which can affect the power quality of many industries or even of the domestic consumers. A poor power quality can cause the malfunction of electrical and electronic devices and equipment, instability, short lifetime. In the case of computers, the disturbances may lead to corrupted files, file loss and to the destruction of the hardware components. Additional costs can occur for both suppliers and consumers.

Features extraction of power quality disturbances using methods of power quality analysis in order to achieve automatic disturbance recognition is important for understanding the cause-effect relation and to improve the power quality.

Book summary

This book contains chapters on power quality monitoring, wavelet and principal component analysis (PCA) of the power quality disturbance classification applying a radial basis function network (RBF), power quality measurement under non-sinusoidal condition, power quality monitoring in a system with distributed and renewable energy sources, application of signal processing in power quality monitoring, methods of power quality analysis, pre-processing tools and intelligent techniques for power quality analysis, selection of voltage referential from the power, single-point methods for location of distortion, unbalance, voltage fluctuation and dip sources, S-transform based novel indices, active load balancing in a three-phase network by reactive power compensation, compensation of reactive power and sag voltage using superconducting magnetic energy storage, optimal location and control of flexible three phase shunt flexible AC transmission systems (FACTS) to enhance power quality in unbalanced electrical network, performance of modification of a three phase dynamic voltage restorer (DVR) for voltage quality improvement; voltage sag mitigation by network reconfiguration.

The chapter Methods of power quality analysis by Gabriel Găşpăresc (Politehnica University of Timişoara) is presented as follows. Nowadays, the researchers must choose the most appropriate method to analyze the raw data. The main objective is feature extraction of power quality disturbances in order to achieve automatic disturbance recognition. A comparative study between DFT, STFT, DWT and ST is presented together with applications in power quality disturbances detection. Supplementary, a solution to improve the STFT analysis is described.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.2. ELECTRICAL ENGINEERING, ELECTRONICS ,TELECOMMUNICATIONS AND INFORMATION TECHNOLOGIES
1.2.3. POWER ENGINEERING

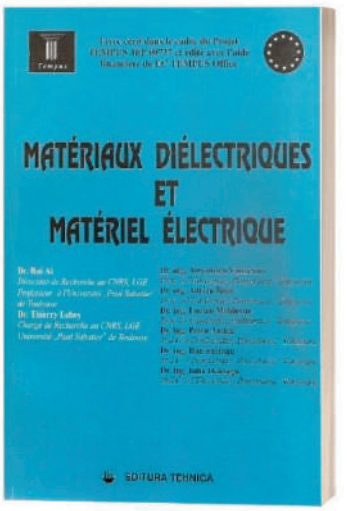
53

MATÉRIAUX DIÉLECTRIQUES ET MATÉRIEL ELECTRIQUE

(1997)

BUI AI, THIERRY LEBEY, ALEXANDRU VASILIEVICI, ADRIAN BUTA, LUCIAN MOLDOVAN, PETRU ANDEA, DAN ȘURIANU, IULIU DELESEGA (EDS.)

Editura Tehnică, București
ISBN: 973-31-1159-7



Short description of the book

This monograph, entirely written in French, is the result of a joint cooperation between specialists from the PAUL SABATIER University of Toulouse, France, and from the POLITEHNICA University of Timisoara, Romania. It has an encyclopaedic character, presenting issues concerning both physical and computational theoretical models, and new and viable technical solutions in the field of advanced electrical materials applied in energy conversion, electrical machines and power electronics. Starting with the main issues, materials applied in electrical engineering, it evolves to state-of-the-art applications.

A lot of original research results, mostly patented by the authors in the field of materials and maintenance of existing equipment, are presented, being the result of the work done by the authors during their research internships in France and Romania.

The book describes all major issues regarding insulating electrical materials (polarization, losses, breakdown, conductivity) and a large area of related applications, most of them from the area of high voltage power devices or electrical machines.

This monograph is dedicated not only to students (completing a bachelor's or master's degree), but also to PhDs and specialists from the industry, both from France and Romania.

Book summary

Part I – Electrical Materials

Chapter 1 is an introduction to the polarization of insulating materials, with all aspects related to the mathematical research models and the physical reality of this phenomena.

Chapter 2 describes the dielectric breakdown appearing in insulating materials, in all states (solid, liquid or gas), starting from the analytical models up to the physical reality.

Chapter 3 presents the partial discharges in solid, liquid or gas environments and all measures applied to decrease their effects.

Part II – Electrical Equipment

Chapter 4 is entirely dedicated to the High Voltage Transport Lines, treating all aspects about their functioning and maintenance, both theoretical and practical.

Chapter 5 is related to high voltage electrical equipment (separators, capacitors, switches, transformers, surge arresters or other protective devices), its service and maintenance as well as the materials for its structure.

Chapter 6 presents issues related to electrical machines, their construction and the influence of dielectric materials on their service. The magnetic materials used in their construction are also presented.

Chapter 7 is a brief description of the testing procedures and equipment, involved in the high voltage domain, for all types and categories of active devices.

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IMPEDANŢA ARMONICĂ A REŢELELOR SISTEMELOR ELECTROENERGETICE

[HARMONIC IMPEDANCE OF NETWORKS WITHIN ELECTRICAL POWER SYSTEMS]

(2000)

ADRIAN BUTA, LIVIUS MILEA, ADRIAN PANĂ

Editura Tehnică
ISBN: 973-31-1522-3

Short description of the book

Undoubtedly, one of the most important current issues of electrical power engineering is the quality of electricity that has to be understood in the context of the interaction between the suppliers' installations and those of the energy consumers (costumers) affected by disturbances. Among the disturbances of the power system is the harmonic pollution. The quick development of industrial and transport processes, their modernization by using power electronics, has favoured the penetration and expansion of nonlinear devices, important for deforming the voltage and current waveforms. At the beginning, it was considered that the high-power non-linear loads like the welding installations, the arc furnaces, the railway traction, etc. actually caused the distortions. Nevertheless, it was found later that a great diversity of low power receivers led to distorted currents and voltages. Under these conditions, the compensation of the reactive power in the network buses becomes a difficult operation and it must be done together with the harmonics filtering, the frequency response of the network in that way being determinant. The frequency response is, in fact, the harmonic impedance of the network seen in that bus. This work aims to present as many aspects as possible regarding the definition, calculation and experimental estimation of the harmonic impedance, including the emphasis on its role in increasing the performance of the electrical network and, implicitly, the quality of the power distributed to consumers.

The book addresses students, engineers and technicians in the field of power engineering, all those interested in the power quality issues and in the increase of the transport and distribution networks operating performances.

Book summary

The first chapter introduces the main problems of the non-sinusoidal regime, its causes, its effects, the voltage and current quality indicators in the harmonically polluted networks.

The second chapter presents issues related to the definition of harmonic impedances and its role in the harmonic calculation and analysis of the electrical networks.

In the third chapter, the harmonic equivalent positive sequence schemas of the network elements: line, transformer, shunt coil, capacitor bank and their parameters are presented.

The fourth chapter introduces the harmonic modelling of two elements of the power system: the synchronous generator and the linear consumer. The asynchronous motor models and the complex consumer are presented.

In the fifth chapter, issues related to the modelling and behaviour of measuring transformers under non-sinusoidal conditions are highlighted. The errors occurring in the measurement process and the role of the transfer function as well as the results of experimental determinations are presented.

The sixth chapter points to the calculation of the harmonic impedance. The issue is presented in a wider context, namely in the calculation of harmonic currents and voltages.

The seventh chapter describes the issues that arise from the experimental identification of harmonic impedances and presents the way to perform the measurements, to process the data and to draw some useful conclusions.

The eighth chapter highlights, based on a quantitative and qualitative analysis, the determinant role of the harmonic impedance in choosing the correct solution for reactive power compensation.

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COMANDA ŞI CONTROLUL FUNCŢIONĂRII REŢELELOR ELECTRICE

[COMMAND AND CONTROL OF THE ELECTRICAL NETWORKS OPERATION]

(2001)

VASILE DUŞA, VICTOR VAIDA

Editura Tehnică
ISBN: 973-31-2048-0

Short description of the book

The continuous power increase of the energy objectives, the need for uninterrupted supply of electricity to consumers and, consequently, the widespread introduction of the automation of electrical installations make the problems related to the design and operation of electrical installations very complex. However, the technical literature comprises a small number of books dealing with these extremely important issues of the power system. The necessary knowledge can be acquired mainly by consulting the multitude of technical prescriptions, each of them containing a limited number of problems, some of them being tackled in depth and others omitted.

In the present book, the authors present, systematically and unitarily, all the problems specific to the command and control of the electrical network operation. The book is useful to a large circle of specialists in the design, execution and operation of the electrical network installations, but also to the students completing a degree in power engineering. It takes into account the most recent standards regarding the design and operation of electrical installations. However it is true that, considering the technical progress, there will be various new solutions that could influence some of the presented aspects.

Book summary

The content of the book is structured into six chapters. Thus, in Chapter 1, the organization of the operative management through the dispatcher of the power system networks is presented, as well as the functions of the information system for the operative management. Chapter 2 describes, from the point of view of construction and operation, the main

equipment of electric substations (transformers, circuit breakers, separators and measurement transformers), which are directly related to secondary circuits. Chapter 3 presents the constructive structure of the electric substations. Chapters 4, 5 and 6 deal with the command and control of electric substations, namely Chapter 4 presents the general principles for the realization of the secondary circuits, Chapter 5 the wired logic circuitry installations and Chapter 6 solutions for their realization with logic programming.

In order to avoid the reader's load with too much theoretical developments, they have been reduced to a minimum. Only the basic theoretical issues have been presented which will allow the basic knowledge of the theoretical problems to be learned. Particular attention was paid to constructive solutions used for electrical equipment and electrical installations of substations, their operating principles and their general characteristics, necessary for optimal design, installation and operation. To be suggestive and easier to understand, the work includes an important number of figures and tables that convey certain data and values that are absolutely necessary.

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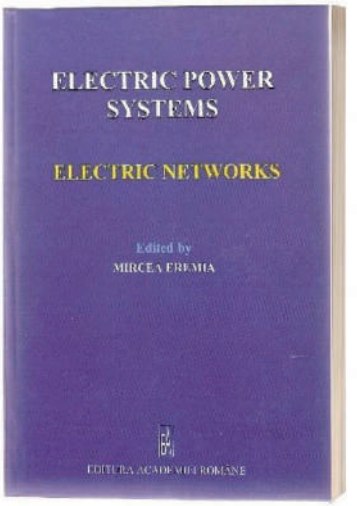
ELECTRIC POWER SYSTEMS

VOL I: ELECTRIC NETWORKS

(2010)

MIRCEA EREMIA (ED.)
Authors from Politehnica University Timisoara: Adrian Buta, Mircea Nemeş, Bucur Luştrea

Editura Academiei Române
ISBN 973-27-1324-0



Short description of the book

Modern power systems are the result of continuous development and improvement, which, over the years, have led to highly sophisticated and complex technologies. Their reliable operation is a tribute to the work of dedicated scientists, innovative engineers and experienced business leaders.

The relatively fast development of the electrical systems and networks has given rise to ceaseless discussions regarding the safe operation and power quality supplied to the customer. Moreover, the energy policy concerning the promotion of renewable energy sources as well as the electricity market creation to stimulate the competition among generation companies have caused new problems in the transmission and distribution networks. It is clear that the initial destination of electrical networks to ensure the unidirectional transmission of power from the power plants towards consumers has changed, since, by the installation of distributed generation sources into the distribution network, the power flow became bidirectional, with the possibility of injecting power into the transmission network.

In the present work the authors tried to cover, in the best way possible, the basic knowledge that the experienced engineer as well as the young graduate student in electrical power systems should be able to handle.

Book summary

Chapter 1. Electric Power Systems configuration and parameters (Adrian Buta, Maria Tudose, Lucian Toma). The chapter presents the architecture of electrical networks and the steady state mathematical modelling of the network elements.

Chapter 2. Radial and meshed networks (Mircea Eremia, Ion Triştiu).

Chapter 3. AC transmission lines (Mircea Eremia, Ion Stratan, Cătălin Dumitru).

Chapter 4. HVDC transmission (Mircea Eremia, Constantin Bulac).

Chapter 5. Neutral grounding of electric networks (Adrian Buta). The chapter presents the efficient measures about neutral grounding of the electric networks, which must be taken so that the network could cope with the faults.

Chapter 6. Electric power quality (Adrian Buta, Lucian Toma). The chapter deals with problems related to power quality and electromagnetic compatibility issues giving at the same time mitigation solutions.

Chapter 7. Power and energy losses in electric networks (Hermina Albert).

Chapter 8. Performance methods for power flow studies (Virgil Alexandrescu, Sorin Pătrăşcoiu)

Chapter 9. State estimation of electric power systems (Mircea Nemeş). The chapter provides an efficient approach for real time responding to the fast speed at which the electric phenomena are evolving.

Chapter 10. Steady state optimization (Gheorghe Cârţină, Zong Hua Song).

Chapter 11. Load forecast (Bucur Luştrea). The chapter is an useful tool for the system operator which must know a priori the load consumption in order to maintain the frequency at a certain value.

Chapter 12. Electric networks impact on the environment (George Florea).

Chapter 13. Overhead transmission lines technical design (Georgel Gheorghiţă, Laurenţiu Nicolae).

Chapter 14. Distributed generation (Nikos Hatziargyriou).

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.3. SYSTEMS ENGINEERING, COMPUTER AND INFORMATION TECHNOLOGY

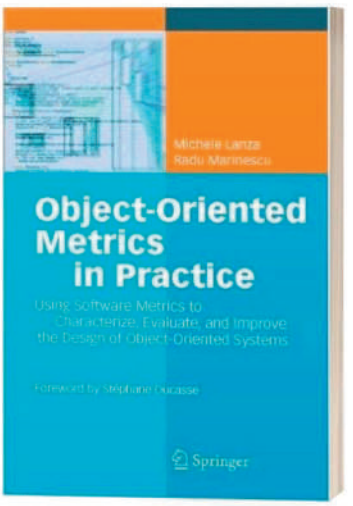
1.3.1. COMPUTER AND INFORMATION TECHNOLOGY

57 OBJECT-ORIENTED METRICS IN PRACTICE

(2006)

MICHELE LANZA, RADU MARINESCU

Springer-Verlag
ISBN: 978-3-540-39538-6
DOI: 10.1007/3-540-39538-5



Short description of the book

Metrics are paramount in every engineering discipline. Software engineering, however, is not considered a classical engineering activity for several reasons. In general, if a software system is seen to deliver the required functionality, only few people if any care about the internals. Moreover, defining, understanding and applying software metrics often looks like an overly complex activity, recommended only to 'trained professionals'.

Lanza and Marinescu demystify the design metrics used to assess the size, quality and complexity of object-oriented software systems. Based on statistical information from many industrial projects and generally accepted semantics they deduce many single and combined threshold values. They show in detail how to identify collaboration and classification disharmony patterns in code, how to visualize their results using the freely available *CodeCrawler* visualization tool, and how to devise possible remedies.

The combination of theoretically sound results and practically tested procedures and solution paths makes this book an ideal companion for professional software architects, developers and quality engineers. The pattern-oriented description of disharmonies offers easy access to detecting shortcomings and applying solution strategies.

Book summary

The introductory chapter is followed by Chapter 2 (*Facts on Measurements and Visualization*) which presents a practical view on metrics and the usual pitfalls of their use and how we circumvent them in this book.

Chapter 3 (*Characterizing the Design*) presents two metrics-based techniques, the *Overview Pyramid* and *Polymetric Views*, to get an overview of the design of a large software system. The *Overview Pyramid* assembles in one place the most significant measurements about an object-oriented system. *Polymetric Views* are metrics-enriched visualizations of software entities and their relationships. Their main benefit is that they can visually render numbers in a simple, yet effective and highly condensed way that is directly interpretable by the viewer.

Chapter 4 (*Evaluating the Design*) presents two further techniques to provide more fine-grained understanding and assessment of the design of an application: *Detection Strategy* and *Class Blueprint*. *Detection strategies* are queries, expressed as a combination of metrics, that provide us with a means to detect flawed entities. A *Class Blueprint* is a semantically enriched and layered visualization of the control-flow and access structure of classes.

The following three chapters (*Identity Disharmonies*, *Collaboration Disharmonies*, and *Classification Disharmonies*) present a catalogue of design disharmonies. Each chapter presents general design rules for the design of classes, their collaboration and their position in the inheritance hierarchy. These rules offer a unified way of approaching design through three general viewpoints: proportion, presentation, and its implementation.

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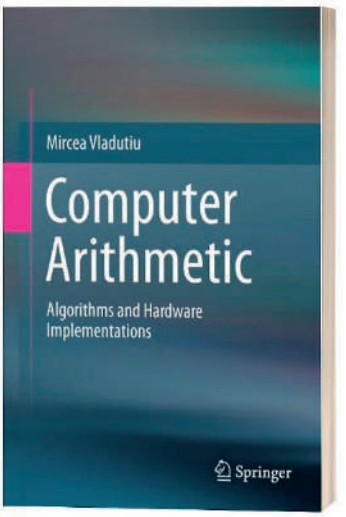
COMPUTER ARITHMETIC. ALGORITHMS AND HARDWARE IMPLEMENTATIONS

(2012)

MIRCEA VLĂDUȚIU

Springer
ISBN 978-3-642-18314-0
ISBN 978-3-642-18315-7 (eBook)
DOI 10.1007/978-3-642-18315-7



Short description of the book

The range of applications that stretch from automation of the complex industrial processes to facilitating domestic activities is exceedingly diverse, this being the reason for which the tendency to "tailor" computer's architecture for covering a finite set of related applications appears as natural. Consequently, there is an application field for which the computer needs to be dissected down to its most in-depth structural elements in order to succeed in removing those useless details that hinder its performance. This book aims to reveal the part that bears the key to performance increase in a computer, namely the computer's arithmetic.

The subject of the book is the analysis and design of digital devices that implement computer arithmetic. The book presents ample details, descriptions, formalisms and design principles, thus supporting many research activities in this field, with an emphasis on bridging the gap between algorithm optimization and hardware implementation. The author provides a unified view linking the domains of digital design and arithmetic algorithms, based on original formalisms and hardware description languages.

A feature of the book is the large number of examples and the implementation details provided. While the author does not avoid high-level details, providing, for example, gate-level designs for matrix/combinational arithmetic structures.

The book is suitable for researchers and students that design hardware in computer science and engineering using a unitary analysis procedure, starting with the algorithmic aspects, continuing with the hardware design and performance evaluation.

Book summary

Chapter 1 contains fundamental notions about the number representations in computation. The emphasis is on the fixed-point addition operation, both binary and decimal, and the specific elements corresponding to the IEEE 754 floating point binary standard.

Chapter 2 approaches the problems of functional analysis and synthesis of the parallel addition and subtraction devices. Some performance improvements with respect to the maximal addition time are analyzed. One distinct section is allocated to the parallel parity checked adders allowing for the enhancement of reliability and dependability.

Chapter 3 is dedicated to the functional analysis and synthesis of multiplication devices. There is a distinctive emphasis on techniques for multiplication process speed-up, based on raising the value of the number systems radix and use of a carry-save adder, as well as on combinational array and tree structures.

Chapter 4 presents the functional analysis and synthesis of division devices. Special focus is on the combinational array structures and providing solutions for dividing signed fractional binary numbers based on the non-restoring procedure, respectively, for dividing unsigned binary integer numbers based on the restoring procedure.

Chapter 5 is dedicated to the functional analysis and synthesis of the floating-point devices. The steps of the algorithm for floating point addition/subtraction with rounding are dissected and the methods for speeding up the process are investigated. There is an extensive presentation of the structures based on parallel computation, context in which some innovative solutions based on reconfigurable synthesis are revealed.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

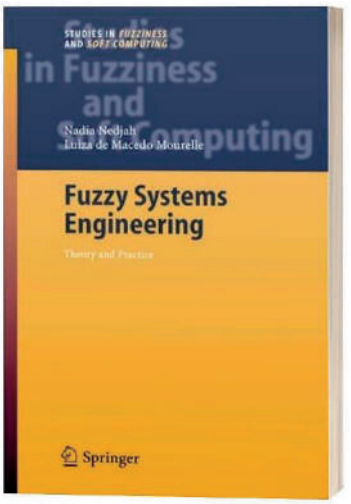
1

ENGINEERING SCIENCES

1.3. SYSTEMS ENGINEERING, COMPUTER AND INFORMATION TECHNOLOGY
1.3.2. AUTOMATION AND APPLIED INFORMATICS

59

ON THE STABILITY AND SENSITIVITY ANALYSIS OF FUZZY CONTROL SYSTEMS FOR SERVO-SYSTEMS



(2005)

RADU-EMIL PRECUP, STEFAN PREITL

BOOK CHAPTER PUBLISHED IN FUZZY SYSTEMS ENGINEERING, THEORY AND PRACTICE

NADIA NEDJAH, LUIZA DE MACEDO MOURELLE (EDS.)

SPRINGER
Online ISBN: 978-3-540-32397-6
Print ISBN: 978-3-540-25322-8
DOI: 10.1007/11339366_6

Short description of the book

This book is devoted to reporting innovative and significant progress in fuzzy system engineering. Given the maturation of fuzzy logic, this book is dedicated to exploring the recent breakthroughs in fuzziness and soft computing in favor of intelligent system engineering. This monograph presents novel developments, at the level of 2005, of the fuzzy theory as well as interesting applications of the fuzzy logic exploiting the theory to engineer intelligent systems.

Chapter summary

Control systems must ensure, in real-world applications, good steady-state and dynamic performance. This is the reason why they need high quality servosystems to perform the tasks of stabilization and tracking, and to deal with the problems created by the parameter variance or the nonlinearities. A way to fulfil these tasks is to employ fuzzy control. The development of fuzzy control systems is usually performed by heuristic means, incorporating human skills, but the drawback is in the lack of general-purpose development methods. A major problem, which follows from this way of developing fuzzy controllers, is the analysis of the structural

properties of the control system, such as stability, controllability and robustness. This is the reason for the first aim of the chapter, to present stability analysis methods dedicated to fuzzy control systems for servo-systems: the state-space approach, the use of Popov's hyperstability theory, the circle criterion and the harmonic balance method.

The second aim of the chapter is to perform the sensitivity analysis of fuzzy control systems with respect to the parametric variations of the controlled plant for a class of servo-systems based on the construction of sensitivity models; both of them, the stability and sensitivity analysis, provide useful information to the development of fuzzy control systems.

The presented case studies concerning fuzzy controlled servo-systems validate the presented methods. Since some of the case studies deal with several fuzzy controllers, there are derived useful development conditions for these ones.

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INTERPOLATIVE-TYPE CONTROL SOLUTIONS

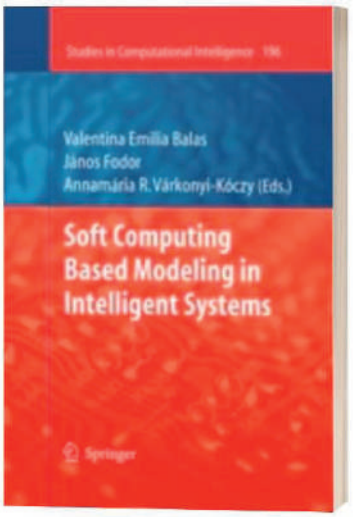
(2000)

SANDA DALE, TOMA-LEONIDA DRAGOMIR

BOOK CHAPTER PUBLISHED IN SOFT COMPUTING BASED MODELING IN INTELLIGENT SYSTEMS

VALENTINA EMILIA BALAS, JÁNOS FODOR, ANNAMÁRIA VÁRKONYI-KÓCZY (EDS.)

SPRINGER
ISBN: 978-3-642-00448-3
DOI: 10.1007/978-3-642-00448-3



Short description of the book

The book includes soft computing implementations of intelligent systems models. The recent popularity of fuzzy systems, neural networks and evolutionary computation, considered as related in AI, are now widely used to build intelligent systems. Professor Lotfi A. Zadeh has suggested the term "Soft Computing" for all new techniques working in these new areas of AI. Soft Computing techniques are tolerant to imprecision, uncertainty and partial truth. Due to the large variety and complexity of the domain, the constituting methods of Soft Computing are not competing for a comprehensive ultimate solution. Instead they are complementing each other, for dedicated solutions adapted to each specific problem. Hundreds of concrete applications are already available in many domains. Model based approaches offer a very challenging way to integrate a priori knowledge into procedures. Due to their flexibility, robustness, and easy interpretability, the soft computing applications will continue to have an exceptional role in our technologies. The book includes 9 chapters. The electronic version of the book has already more than 2600 downloads. The book covers three disciplines: Artificial Intelligence (incl. Robotics), Applied Mathematics, and Computational Methods of Engineering.

Chapter summary

Contents of the book: 1. Soft Computing Methods for Global, Local and Personalized Modeling and Applications in Bioinformatics, *Nikola Kasabov* - 1, ..., 9. Interpolative-Type Control Solutions, *Sanda Dale, Toma-Leonida Dragomir* – 169.

Presentation of chapter 9: The controllers with interpolative blocks can replace fuzzy controllers in control structures. This is possible because fuzzy controllers belong also to the interpolative-type controller category, meaning controllers which implements interpolative-type reasoning. That kind of replacement is not only a formal operation; it is also associated with further corrections that confer the structures with interpolative controllers enough flexibility to obtain better performances. The possibility of performances improvement on a flexible structure is the main argument of the present paper. Another argument is the reduced calculus time, suited for the real-time implementation - it's about "look-up table" type solutions and the possibility to obtain simple controllers with robustness properties. In order to support the above statements, two case studies are presented in the paper: an electromechanical ball and beam nonlinear system and a positioning system with Lyapunov constraints and state limitations.

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AUTOMATICA

[AUTOMATION]

(VOL 1, 2009)

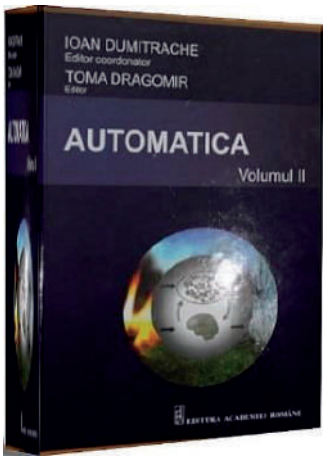
IOAN DUMITRACHE (ED.)

(VOL 2, 2013)

IOAN DUMITRACHE (COORD.ED.),
TOMA L. DRAGOMIR (ED.)

Editura Academiei Române
VOL. I: ISBN: 978-973-27-1883-4; 978-973-27-1882-7;
VOL. II, ISBN: 978-973-27-1882-7; 978-973-27-2298-5

Short description of the book



The monograph „Automatica" constitutes a synthesis of the most representative theoretical and practical results in a domain in which a natural symbiosis between the evolution of science and technology, and communication, in particular, has remarkably developed. The work is structured into three volumes. The first volume treats the issues of modelling, analysing, and synthesizing controllers in the case of linear and nonlinear systems. Methodological and procedural aspects are presented starting from basic functional mathematical models or functional-structural models, with continuous or discrete representation. The second volume synthesizes theoretical and procedural results regarding the implementation of advanced control techniques for complex processes with multiple-input multiple-output representation. Stochastic, adaptive, intelligent systems, as well as discrete events systems, delayed systems and distributed parameters systems are considered. The third volume presents case studies, selected from high interest domains, in which control and automation represents a natural requirement for ensuring performance. Conceptual and applicative aspects of modelling and controlling complex systems are analyzed through a multi C paradigm.

Book summary

Vol. I: 1. Mathematical background (Toma Dragomir, Mihail Voicu, Daniel Moga), 2. Signals (Toma Dragomir, Mihai Dobra), ..., 18. Diagnosis and decision in control systems (Matei Vânâtoru, Eugen Iancu). Chapter 1 synthetically introduces the main notions and mathematical tools that domain experts employ, thus building the formal framework for the developments in the further chapters. Chapter 2 presents the fundamental notions of signals, as well the formal support of their characterization.

Vol. II: 19. Dissipative systems (Corneliu Popeea, Jora Boris), ..., 30. Intelligent control systems (Ioan Dumitrache, Cătălin Buiu, Toma Dragomir). Chapter 30 presents a synthesis of the following topics: intelligent control systems, analysing architectures of intelligent control systems, intelligent methodologies and architectures of intelligent hybrid systems, highlighting the directions of research and some applicative results of intelligent systems. The up-to-date analysis of the main results in the system theory, of the advanced control strategies, characterized by mathematical models and linguistic models, highlight the necessity of using models with maximum adequacy to reality in the case of very complex systems.

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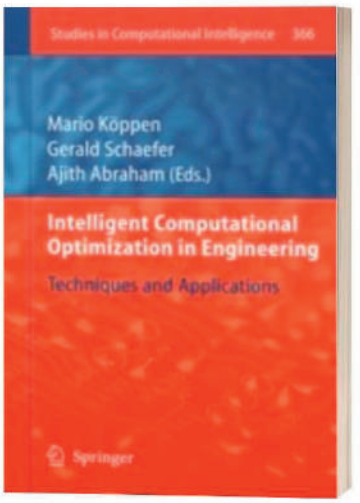
OPTIMAL CONTROL SYSTEMS WITH REDUCED PARAMETRIC SENSITIVITY BASED ON PARTICLE SWARM OPTIMIZATION AND SIMULATED ANNEALING



(2011)

RADU-EMIL PRECUP, RADU-CODRUT DAVID,
STEFAN PREITL, EMIL M. PETRIU, JOZSEF K. TAR

BOOK CHAPTER PUBLISHED IN INTELLIGENT COMPUTATIONAL OPTIMIZATION IN ENGINEERING TECHNIQUES AND APPLICATIONS
MARIO KÖPPEN, GERALD SCHAEFER, AJITH ABRAHAM (EDS.)
SPRINGER
eBook ISBN: 978-3-642-21705-0; Hardcover ISBN: 978-3-642-21704-3
Softcover ISBN: 978-3-642-26940-0

DOI: 10.1007/978-3-642-21705-0_7

Short description of the book

We often come across computational optimization virtually in all branches of engineering and industry. Many engineering problems involve heuristic search and optimization, and, once discretized, may become combinatorial in nature, which gives rise to certain difficulties in terms of solution procedure. Some of these problems have enormous search spaces, are non-deterministic polynomial-time (NP)-hard and hence require heuristic solution techniques. Another difficulty is the lack of ability of classical solution techniques to determine appropriate optima of non-convex problems. Under these conditions, recent advances in computational optimization techniques have been shown to be advantageous and successful compared to classical approaches.

This book presents some of the latest developments occuring until 2011, with a focus on the design of algorithms for computational optimization and their applications in practice.

Through the chapters of this book, researchers and practitioners share their experience and newest methodologies with regard to intelligent optimization and provide various case studies of the application of intelligent optimization techniques in real-world applications. This book can serve as an excellent reference for researchers and graduate students in computer science, various engineering disciplines and the industry.

Chapter summary

Many control systems are tuned based on idealized linear or linearized models of the controlled processes. However, industrial processes are subjected to parametric variations of the controlled processes, which result into models that are either nonlinear or only locally linearized around several nominal operating points or trajectories. Therefore, it is necessary to do a sensitivity analysis with respect to the parametric variations of the controlled process.

This chapter discusses theoretical and design aspects for optimal control systems with a reduced parametric sensitivity using Particle Swarm Optimization (PSO) and Simulated Annealing (SA) algorithms. Sensitivity models with respect to the parametric variations of the controlled process are derived and the optimal control problems are defined. The new objective functions in these optimization problems are integral quadratic performance indices that depend on the control error and squared output sensitivity functions. Different dynamic regimes are considered. Relatively simple PSO and SA optimization algorithms are developed for the minimization of the objective functions, which optimize the control system responses and reduce the sensitivity to parametric variations of the controlled process. Examples of optimization problems encountered in the design of the optimal proportional-integral (PI) controllers for a class of second-order processes with an integral component are used to validate the proposed methods.

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CUTTING EDGE RESEARCH IN NEW TECHNOLOGIES

(2012)

CONSTANTIN VOLOŞENCU (ED.)

IntechOpen Limited, London, U. K.
ISBN 978-953-51-0463-6
DOI: 10.5772/2431

Short description of the book

The book "Cutting Edge Research in New Technologies" presents the contributions of some researchers in the modern fields of technology, serving as a valuable tool for scientists, researchers, graduate students and professionals. The focus is on several aspects of designing and manufacturing, examining complex technical products and some aspects of the development and use of industrial and service automation. The book covers some topics such as manufacturing, machining, textile industry, CAD/CAM/CAE systems, electronic circuits, control and automation, electric drives, artificial intelligence, fuzzy logic, vision systems, neural networks, intelligent systems, wireless sensor networks, environmental technology, logistic services, transportation, intelligent security, multimedia, modelling, simulation, video techniques, water plant technology, globalization and technology. This collection of articles offers information which achieves the general goal of technology - how to develop manufacturing systems, methods, algorithms, how to use devices, equipment, machines or tools in order to increase the quality of the products, the human comfort or security.

Book summary

The book has 15 chapters as follows:

1. Some Contributions at the Technology of Electrochemical Micromachining with Ultra Short Voltage Pulses

2. CMOS and BiCMOS Regenerative Logic Circuits

3. A New Pre-Wet Sizing Process - Yes or No?

4. New IM Torque Control Scheme with Improved Efficiency and Implicit Rotor Flux Tracking

5. Applying the Technology of Wireless Sensor Network in Environment Monitoring
6. Tracking Players in Indoor Sports Using a Vision System Inspired in Fuzzy and Parallel Processing
7. Logistics Services and Intelligent Security Control for Transport Companies
8. Comparison of Two Approaches to Count Derivations for Continuous-Time Adaptive Control
9. Implementation of Control Design Methods into Matlab Environment
10. DRM & Security Enabling Mechanisms Leveraging User Centric Multimedia Convergence
11. Video Compression from the Hardware Perspective
12. Effect of Decentralized Clustering Algorithm and Hamming Coding on WSN Lifetime and Throughput
13. Implementation of Massive Artificial Neural Networks with CUDA
14. Modelling of System for Transport and Traffic Information Management in Republic of Croatia
15. Modelling of Critical Water Quality Indicators for Water Treatment Plant

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NEW TECHNOLOGIES - TRENDS, INNOVATIONS AND RESEARCH

(2012)

CONSTANTIN VOLOŞENCU (ED.)

IntechOpen Limited, London, U. K.
ISBN 978-953-51-0480-3
DOI: 10.5772/2430

Short description of the book

The book "New Technologies - Trends, Innovations and Research" presents contributions made by researchers from the entire world and from some modern fields of technology, serving as a valuable tool for scientists, researchers, graduate students and professionals. Some practical applications in particular areas are presented, offering the capability to solve problems resulted from economic needs and to perform specific functions. The book enables scientists and engineers to get familiar with the ideas of some researchers in some modern fields of activity. It provides interesting examples of practical applications of knowledge, it offers guidance in the designing process, and it changes some research areas. A collection of techniques, that combine scientific resources, is provided to make necessary products with the desired quality criteria. Strong mathematical and scientific concepts are used in the applications. They meet the requirements of utility, usability and safety. Technological applications presented in the book have appropriate functions and they may be exploited with competitive advantages. The book has 17 chapters, covering the following topics: manufacturing technologies, nanotechnologies, robotics, telecommunications, physics, dental medical technologies, smart homes, speech technologies, agriculture technologies and management.

Book summary

The book has 17 chapters, as follows:

1. Microassembly Using Water Drop, By Taksehi Mizuno

2. Design and Simulation-Based Optimization of Cooling Channels for Plastic Injection Mold, By Hong-Seok Park and Xuan-Phuong Dang

3. Biologically Inspired Techniques for Autonomous Shop Floor Control, By Hong-Seok Park, Ngoc-Hien Tran and Jin-Woo Park

4. The Micro Injection Moulding Process for Polymeric Components Manufacturing, By R. Surace, G. Trotta, V. Bellantone and I. Fassi

5. Recent Advances in Multi-Dimensional Packing Problems, By Teodor Gabriel Crainic, Guido Perboli and Roberto Tadei

6. Nano Research Trends of Critical Scientific Fields Across Leading Worldwide Geo-Economic Players and Their Spatial Interactions, By Mario Coccia, Ugo Finardi and Diego Margon

7. Improving Accuracy and Flexibility of Industrial Robots Using Computer Vision, By Petar Maric and Velibor Djalic

8. A Framework for VoIP Testability and Functionality Extension with Interactive Content Delivery, By Janez Stergar, Janez Klanjšek and Sibila Vadlja

9. Application of Radiosity Simulation Methods for Lighting Researches, By Ruzena Kralikova and Katarina Kevicka

10. Combined-Correlated Methods Applied to the Analysis of Dental Prostheses Materials Quality, By Diana Laura Cotoros and Mihaela Ioana Baritz

11. Smart Homes as Service Platforms for New Healthcare and Energy Services, By Mikko Pynnönen and Mika Immonen

12. Recent Progress in Development of Language Model for Slovak Large Vocabulary Continuous Speech Recognition, By Jozef Juhár, Ján Staš and Daniel Hládek

13. The Use of High-Speed Imaging Systems for Applications in Precision Agriculture, By Bilal Hijazi, Thomas Decourselle, Sofija Vulgarakis Minov, David Nuyttens, Frederic Cointault , Jan Pieters and Jürgen Vangeyte

14. Team Building for Implementation of Concurrent Engineering Loops, By Lidija Rihar, Janez Kušar, Tomaž Berlec and Marko Starbek

15. The Development Process as a Complex and Interdisciplinary Team Based Challenge, By Michael Bader and Mario Fallast

16. Risk Management in Area of Security and Protection of Health During the Work, By Andrea Seňová and Katarína Čulková

17. Open and Integral Innovation on Tablet PC by Popularized Advanced Media as Industrial Cradle, By Makoto Takayama

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REFERENCE VALUE GENERATOR OF MAXIMUM POWER POINT COORDINATES OF THE PHOTOVOLTAIC PANEL EXTERNAL CHARACTERISTIC

(2013)

TOMA-LEONIDA DRAGOMIR,
FLAVIUS-MAXIM PETCUȚ, ADRIAN KORODI

BOOK CHAPTER PUBLISHED IN NEW CONCEPTS AND APPLICATIONS IN SOFT COMPUTING

VALENTINA EMILIA BALAS, JÁNOS FODOR, ANNAMÁRIA R. VÁRKONYI-KÓCZY (EDS.)

SPRINGER
ISBN: 978-3-642-28959-0
DOI: 10.1007/978-3-642-28959-0

Short description of the book

The book provides a sample of research on the innovative theory and applications of soft computing paradigms. The idea of Soft Computing was initiated in 1981 when Professor Zadeh published his first paper on soft data analysis and constantly evolved ever since. Professor Zadeh defined Soft Computing as the fusion of the fields of fuzzy logic (FL), neural network theory (NN) and probabilistic reasoning (PR), with the latter subsuming belief networks, evolutionary computing including DNA computing, chaos theory and parts of learning theory into one multidisciplinary system. As Zadeh said, the essence of soft computing is that unlike the traditional, hard computing, soft computing aims at an accommodation with the pervasive imprecision of the real world. Thus, the guiding principle of soft computing is to exploit the tolerance for imprecision, uncertainty and partial truth to achieve tractability, robustness, low solution cost and better rapport with reality. In the final analysis, the role model for soft computing is the human mind. The book includes 12 chapters. The electronic version of the book has already more than 7500 downloads. The book covers two disciplines: Artificial Intelligence (incl. Robotics), and Computational Intelligence.

Chapter summary

Content of the book: 1. Combined Haar-Hilbert and Log-Gabor Based Iris Encoder - *Valentina E. Balas, Iulia M. Motoc, Alina Barbulescu* - 1, ..., 5. Reference Value Generator of Maximum Power Point Coordinates of the Photovoltaic Panel External Characteristic - *Toma-Leonida Dragomir, Flavius-Maxim Petcuț, Adrian Korodi* – 71, ...

Presentation of chapter 5: Generally, maximum power point tracking strategies designed to control the solar panels are based on using as references the coordinates of maximum power point of the solar panel external characteristic I (V). The tracking problem makes sense due to the variability of the external characteristic with respect to panel temperature, θ_{PV_P}, and total radiation absorbed by the panel, G_{PV_P}. This chapter presents a solution to obtain the coordinate of the maximum power point from the variables that may be directly measured: air temperature θ_{air}, normal direct radiation G_{h-dir} and diffuse horizontal radiation G_{h-diff}. A structure called reference value generator, composed of two blocks, Estimator block and Generator block, is used to calculate the coordinates. The first block estimates from θ_{air}, G_{h-dir} and G_{h-diff} the values of θ_{PV_P} and G_{PV_P}, while the second one generates the desired coordinates.

As starting point to develop the model of the solar panel and to extract the maximum power point coordinates, a two-diode electrical circuit was considered. Finally, a generator block consisting in a look-up model is designed. Because for practical cases only a small number of experimental external characteristics are available the generator uses a global interpolation method. The presentation is built on a case study that exploits experimental characteristics taken from references.

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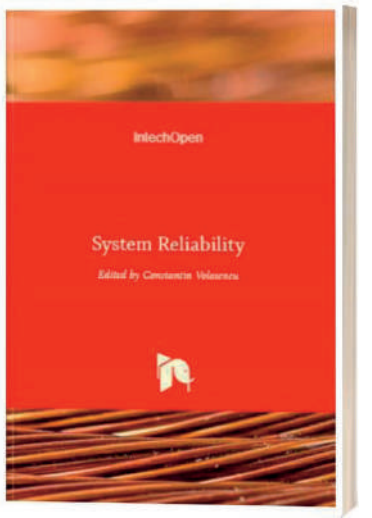
SYSTEM RELIABILITY

(2017)

CONSTANTIN VOLOŞENCU (ED.)

IntechOpen Limited, London, U. K.
ISBN 978-953-51-0463-6 978-953-51-3706-1, 978-953-51-3705-4
DOI: 10.5772/66993



Short description of the book

Researchers from the entire world write to figure out their newest results and to contribute with new ideas or solutions in the field of system reliability and maintenance. Their articles are grouped into four sections: reliability, reliability of electronic devices, power system reliability and feasibility and maintenance. The book is a valuable tool for professors, students and professionals, with its presentation of issues that may be taken as examples applicable to practical situations. Some illustrative examples are highlighted: system reliability analysis based on goal-oriented methodology; reliability design of water-dispensing systems; reliability evaluation of drivetrains for off-highway machines; extending the useful life of asset; network reliability for faster feasibility decision; analysis of standard reliability parameters of technical systems' parts; cannibalisation for improving system reliability; mathematical study on the multiple temperature operational life testing procedure, for electronic industry; reliability prediction of smart maximum power point converter in photovoltaic applications; reliability of die interconnections used in plastic discrete power packages; the effects of mechanical and electrical straining on performances of conventional thick-film resistors; software and hardware development in the electric power system; electric interruptions and loss of supply in power systems; feasibility of autonomous hybrid AC/DC microgrid system; predictive modelling of emergency services in electric power distribution systems; web-based decision-support system in the electric power distribution system; preventive maintenance of a repairable equipment operating in severe environment, and others.

Book summary

The book has 20 chapters as follows:

1. Complex System Reliability Analysis Method: Goal-Oriented Methodology, By Yi Xiao-Jian, Shi Jian and Hou Peng

2. Reliability Design of Mechanical System-Like Water-Dispensing System in Refrigerator Subjected to Repetitive Impact Loading, By Seong-woo Woo

3. Down Time Terms and Information Used for Assessment of Equipment Reliability and Maintenance Performance, By Jon T. Selvik and Eric P. Ford

4. Updated Operational Reliability from Degradation Indicators and Adaptive Maintenance Strategy, By Christophe Letot, Lucas Equeter, Clément Dutoit and Pierre Dehombreux

5. Obtaining and Using Cumulative Bounds of Network Reliability, By Alexey S. Rodionov and Denis A. Migov

6. Spare Parts Forecasting Based on Reliability, By Nataša Kontrec and Stefan Panić

7. Model Development for Reliability Cannibalization, By Bernard Tonderayi Mangara

8. Reliability Evaluation of Drivetrains: Challenges for Off- Highway Machines, By Lothar Wöll, Katharina Schick, Georg Jacobs, Achim Kramer and Stephan Neumann

9. Reliability Prediction Considering Multiple Failure Mechanisms, By Joseph B. Bernstein

10. The Importance of Interconnection Technologies' Reliability of Power Electronic Packages

By Sébastien Jacques

11. Reliability Prediction of Smart Maximum Power Point Converter for PV Applications, By Giovanna Adinolfi and Giorgio Graditi

12. Low-Frequency Noise and Resistance as Reliability Indicators of Mechanically and Electrically Strained Thick-Film Resistors, By Zdravko Stanimirović

13. Coordination and Selectivity of Protection Devices with Reliability Assessment in Distribution Systems, By Marco Antônio Ferreira Boaski, Caio dos Santos, Mauricio Sperandio, Daniel Pinheiro Bernardon, Maicon Jaderson Ramos and Daniel Sperb Porto

14. An Analysis of Software and Hardware Development in the PMU-Based Technology and Suggestions Regarding Its Implementation in the Polish Power Grid, By Michał Szewczyk

15. Power System Reliability: Mathematical Models and Applications

By Rabah Medjoudj, Hassiba Bediaf and Djamil Aissani

16. Techno-Economic Feasibility Study of Autonomous Hybrid AC/DC Microgrid System, By Atanda K. Raji

17. Resource Planning to Service Restoration in Power Distribution Systems, By Magdiel Schmitz, Maria Clara Ferreira Almeida da Silva, Vinícius Jacques Garcia, Daniel Bernardon, Lynceo Favigna Braghirolli and Júlio Fonini

18. Imperfect Maintenance Models, from Theory to Practice, By Filippo De Carlo and Maria Antonietta Arleo

19. A Decision Support System for Planning and Operation of Maintenance and Customer Services in Electric Power Distribution Systems, By Carlos Henrique Barriquello, Vinícius Jacques Garcia, Magdiel Schmitz, Daniel Pinheiro Bernardon and Júlio Schenato Fonini

20. Optimum Maintenance Policy for Equipment over Changing of the Operation Environment, By Ibrahima dit Bouran Sidibe and Imene Djelloul

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ACTUATORS

(2018)

CONSTANTIN VOLOŞENCU (ED.)

IntechOpen Limited, London, U. K.
ISBN: 978-1-78923-429-9, 978-1-78923-428-2
DOI: 10.5772/intechopen.71518

Short description of the book

The book promotes new research results in the field of modern actuators and their applications. New coverage of dielectric barrier discharge plasma actuators, polymeric microgripper based on the cascaded V-shaped electrothermal actuators, ionic polymer actuators, wideband actuators and energy harvesters, electromagnetic actuators and shape memory alloy actuators are comprehended. The book is structured into four sections: design, fabrication and simulation; control systems; medical applications and fault detection. Seven chapters are published following a rigorous selection process. In the first section, a study carried out to investigate experimentally and by numerical simulations a microscale plasma actuator; the design, fabrication, numerical simulations, and experimental investigations of a polymeric microgripper designed using the cascaded V-shaped electrothermal actuators; a review of the development of ionic polymer actuator with introduction of two kinds of typical polymer actuators - ionic polymer-metal composites and bucky gel actuator - with their basic principle and fabrication process and typical applications and a methodology of designing and testing wideband actuators and energy harvesters, treated as one mechanical resonator, with a discussion on shock harvester, resonant harvester and energy transmission system, are presented. The second section has a chapter dedicated to modelling, system identification and control of electromagnetic actuators with main focus on the actuators used in magnetic levitation, in fuel injection systems and in variable valve timing. The third section presents a study focused on quantifying the decline in tactile sensation associated with diabetic neuropathy and developed a measurement device that used a thin-shaped memory alloy wire as the actuator. The fourth section includes a chapter presenting a two-level fault diagnosis and root-cause analysis scheme for a class of interconnected invertible dynamic systems, which aims at detecting and identifying actuator fault and causes.

Book summary

The book has 7 chapters as follows:

1. Dielectric Barrier Discharge Microplasma Actuator for Flow Control, By Kazuo Shimizu and Marius Blajan
2. An SU-8 Microgripper Based on the Cascaded V-Shaped Electrothermal Actuators: Design, Fabrication, Simulation and Experimental Investigations, By Rodica-Cristina Voicu
3. Ionic Polymer Actuators: Principle, Fabrication and Applications, By Yanjie Wang and Takushi Sugino
4. Development of Resonators with Reversible Magnetostrictive Effect for Applications as Actuators and Energy Harvesters, By Jerzy Kaleta, Rafał Mech and Przemysław Wiewiórski
5. Modeling, System Identification, and Control of Electromagnetic Actuators, By Alexandru Forrai
6. Quantitative Tactile Examination Using Shape Memory Alloy Actuators for the Early Detection of Diabetic Neuropathy, By Junichi Danjo, Sonoko Danjo, Hideyuki Sawada, Keiji Uchida and Yu Nakamura
7. Root Cause Analysis of Actuator Fault, By Mei Zhang, Ze-tao Li, Boutaib Dahhou and Michel Cabassud

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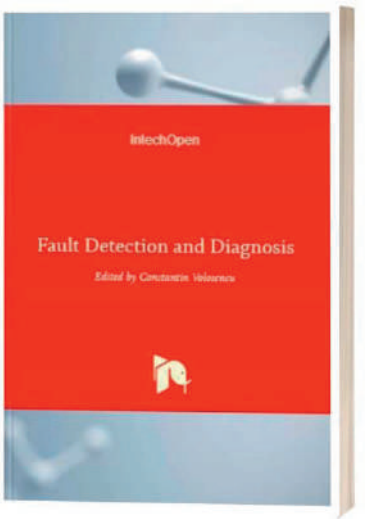
FAULT DETECTION AND DIAGNOSIS

(2018)

CONSTANTIN VOLOŞENCU (ED.)

IntechOpen Limited, London, U. K.
ISBN: 978-1-78984-437-5, 978-1-78984-436-8
DOI: 10.5772/intechopen.76272



Short description of the book

This book offers a selection of papers in the field of fault detection and diagnosis, promoting new research results in the field, which come to join other publications in the literature. Authors from countries of four continents: United States of America, South Africa, China, India, Algeria and Croatia published worked examples and case studies resulting from their research in the field. Fault detection and diagnosis has a great importance in all industrial processes, to assure the monitoring, maintenance and repair of the complex processes, including all hardware, firmware and software. The book has four sections, determined by the application domain and the methods used: 1. Hybrid Computing Systems, 2. Power Systems, 3. Power Electronics and 4. Kalman Filtering. In the first section, the readers will find a technical report on fault diagnosis of hybrid computing systems, based on the chaotic-map method that uses the exponential divergence and wide Fourier properties of the trajectories, combined with memory allocations and assignments. In the second section, two chapters are included: one of them presents a study on preventive maintenance and fault detection for wind turbine generators, using statistical models, and the second chapter presents a technical report on fault diagnosis for turbo-generators, based on the mechanical-electrical intersectional characteristics. The third section contains a technical report that presents some techniques of detection and localization of open-circuit faults in a three-phase voltage source inverter fed induction motor. The fourth section presents a theoretical study on the application of distributed discrete-time linear Kalman filtering with decentralized structure of sensors in fault residual generation.

Book summary

The book has 5 chapters as follows:
1. Fault Diagnosis of Hybrid Computing Systems Using Chaotic-Map Method, By Nageswara S. V. Rao and Bobby Philip
2. Preventive Maintenance and Fault Detection for Wind Turbine Generators Using a Statistical Model, By Ian Kuiler, Marco Adonis and Atanda Raji
3. Hybrid Fault Diagnosis Method Based on Mechanical-Electrical Intersectional Characteristics for Generators, By Yu-Ling He and Yue-Xin Sun
4. A Comparative Study on Some Fault Diagnosis Techniques in Three-Phase Inverter Fed Induction Motors, By Bilal Djamal Eddine Cherif, Azeddine Bendiabdellah, Mokhtar Bendjebbar and Laribi Souad
5. Fault Residuals Based on Distributed Discrete-Time Linear Kalman Filtering, By Dušan Krokavec and Anna Filasová

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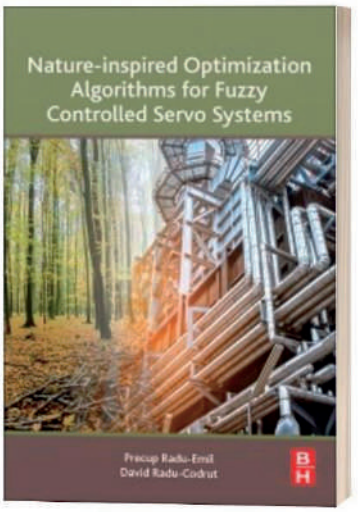
NATURE-INSPIRED OPTIMIZATION ALGORITHMS FOR FUZZY CONTROLLED SERVO SYSTEMS

(2019)

RADU-EMIL PRECUP, RADU-CODRUT DAVID

Butterworth-Heinemann, Elsevier
eBook ISBN: 978-0-128-16606-2
Paperback ISBN: 978-0-128-16358-0
DOI: 10.1016/C2018-0-00098-5



Short description of the book

Nature-inspired Optimization Algorithms for Fuzzy Controlled Servo Systems explains fuzzy control in servo systems in a way that does not require any solid mathematical prerequisite. Analysis and design methodologies are covered, along with specific applications to servo systems and representative case studies. The theoretical approaches presented throughout the book are validated by the illustration of digital simulation and real-time experimental results. This book is a great resource for a wide variety of readers, including graduate students, engineers (designers, practitioners and researchers), and everyone who faces challenging control problems.

The key features of this book are:

- it merges classical and modern approaches to fuzzy control;
- it presents, in a unified structure, the essential aspects regarding fuzzy control in servo systems
- it explains notions of fuzzy set theory and fuzzy control to readers with limited experience.

The readership targeted by this book works in the fields of control engineering, electrical engineering, mechatronics, and power systems (designers, practitioners and researchers), facing control problems.

Book summary

Chapter 1 starts with the motivation and overview of this book. Information on fuzzy sets, operations on fuzzy sets and fuzzy relations are given to be understood and used in the fuzzy controller design and tuning. The fuzzy controller structure and design approaches are formulated for Mamdani and Takagi-Sugeno fuzzy controllers. The main subsystems of the fuzzy control systems for servo systems, namely the process and the proportional-integral fuzzy controller, are described by means of structures and models. Four optimization problems that target the optimal tuning of fuzzy controllers for servo systems are defined.

Chapter 2 describes the mechanisms occurring in four representative nature-inspired optimization algorithms: particle swarm optimization, gravitational search algorithms, charged systems search algorithms, and gray wolf optimizer algorithms. These algorithms are inserted in two steps of the design approach dedicated to the optimal tuning of simple Takagi-Sugeno proportional-integral fuzzy controllers involved in the position control of servo systems. Four optimization problems are solved and some results concerning the algorithms' behavior are outlined.

Chapter 3 describes the adaptation mechanisms in two representative nature-inspired optimization algorithms, namely gravitational search algorithms (GSAs) and charged systems search algorithms. The adaptation in both algorithms is carried out in terms of the 5E learning cycle, and fuzzy logic is inserted in GSAs to adapt two parameters. These algorithms are inserted in the design approach dedicated to the optimal tuning of simple Takagi-Sugeno proportional-integral fuzzy controllers for the position control of servo systems. Four optimization problems are solved and representative results concerning the algorithms' behavior are outlined.

Chapter 4 first describes the hybridization of particle swarm optimization (PSO) and gravitational search algorithms (GSAs) and later introduces a gray wolf optimization (GWO) using PSO's search mechanism. The operating algorithm of a hybrid PSOGSA and GWOPSO are presented. Combining two nature-inspired algorithms is necessary in order to reduce one's search process drawbacks by using the other's fortes. In the case of the PSOGSA, the PSO's exploitation capabilities and GSA's exploration abilities are combined to avoid getting trapped in local minima situations, while in GWOPSO's case, the exploitation advantages of PSO are employed in order to speed the GWO's convergence. The hybrid algorithms are inserted in the design approach dedicated to the optimal tuning of simple Takagi-Sugeno proportional-integral fuzzy controllers for the position control of servo systems. Four optimization problems are solved and some results concerning the hybrid PSOGSA's behavior are presented.

Chapter 5 provides a systematic performance comparison of nature-inspired optimization algorithms in the optimal tuning of Takagi-Sugeno proportional-integral fuzzy controllers (FCs) for the position control of servo systems. Extensions to type-2 fuzzy control, tensor product-based model transformation controllers, and evolving fuzzy systems are discussed and related to optimal tuning of FCs. Perspectives of nature-inspired algorithms applied to fuzzy control are formulated.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.4. MECHANICAL ENGINEERING, MECHATRONICS, INDUSTRIAL ENGINEERING

1.4.1. MECHANICAL ENGINEERING

70

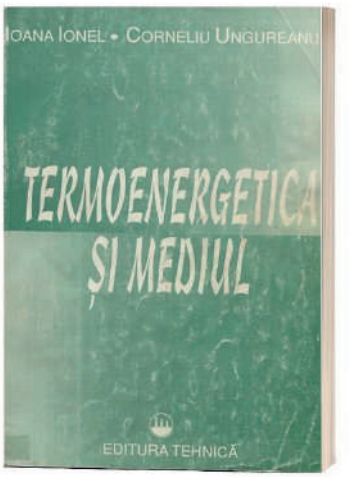
TERMOENERGETICA ŞI MEDIUL

[THERMOENERGETICS AND THE ENVIRONMENT]

(1996)

IOANA IONEL, CORNELIU UNGUREANU

Editura Tehnică
ISBN: 973-31-0746-8



Short description of the book

It is the first volume edited in Romania (1996), concerning the principles of a modern power plant, capable to offer thermal and electrical energy from fossil fuels. As a novelty, it should be mentioned that all graphs and figures were done with the help of a specialized designer programme, and not by hand. The volume contributes to the understanding of the basic nature of the importance to correlate the industrial growth and the human environmental disturbances with the natural systems, of how technology affects them, and may be used to minimize the damaging impacts.

The authors bring a contribution to the training of Romanian specialists in the field of environmental engineering. The scope was to offer the Romanian engineers a comprehensive book presenting technologies for a clean combustion and flue gas cleaning.

The book is the result of the didactic and research work carried out by the authors since 1990 at the Politehnica University of Timisoara. It is also worth mentioning the experience of the authors gained as researchers and teachers (in Romania and Germany), but also the wide documentation based on the consulted relevant international literature. The research contracts that were part of national and international projects, in which the authors had been engaged, provided the examples and case studies that contributed to a real understanding of the results of the application of the modern techniques presented in order to reduce the pollution generated by power plants. As the volume concretely presents various specific methods to reduce pollution, as well the absolute necessity to control, by direct measurements, the exhaust concentrations, it is useful to those who intend to start a career as environmental engineers as well as to those who want to build on their knowledge and understanding of a new era of power plants, much cleaner and environmentally friendly. The computational examples and rich graphical parts are designed to facilitate best

understanding of the material. The book is adapted to the concrete needs of evolution and revitalization of the Romanian energetic system and offers best available solutions of the time.

The book was reedited as a revised, updated and completed form in a second edition.

Book summary

The first chapter (POLLUTANTS EXHAUSTED BY COMBUSTION FACILITIES AND THEIR DISTURBANCES) presents the necessity of maintaining an ecological equilibrium in all human activities, including power generation. The limits of risk are controlled by emissions' regulations. The toxic effects of the major pollutants exhausted by power plants are presented, as well as methods for their rapid assessing and calculations.

The next chapter (REMOVAL OF ASH PARTICLES) presents the material balance of ash, classification of the ash removing facilities, and insists on the basic function of electrostatic precipitators and and fabric collectors.

Chapter 3 (TECHNOLOGIES TO REDUCE THE SULPHURE OXIDES' EMISSIONS) presents an overview of the primary and secondary methods of desulphurization procedures, using different absorbents. Technologies for final wastewater treatment are included.

Chapter 4 (REDUCING OF THE NITROGEN OXIDES' EMISSIONS) focuses in the first part on the genesis of the NOx formation and parameters of influence. Further, primary and secondary methods of denitrification of the flues' gases are described. Selective non-catalytic or catalytic procedures are critically analyzed.

Last chapter (MEASURING PROCEDURES OF THE POLLUTANTS) presents a general overview of the measuring principles; further photometry, colourmetry, fluorescence, chemiluminiscence flame photometry and ionization, conductometry, amperometry coulombmetry, potentiometry are procedures described for measuring different pollutant concentrations. Finally, the general outfit of a modern power plant, including clean combustion and flue gas cleaning systems, as well as the instruments and automatics necessary to control the ecological functionality of a modern power plant are presented.

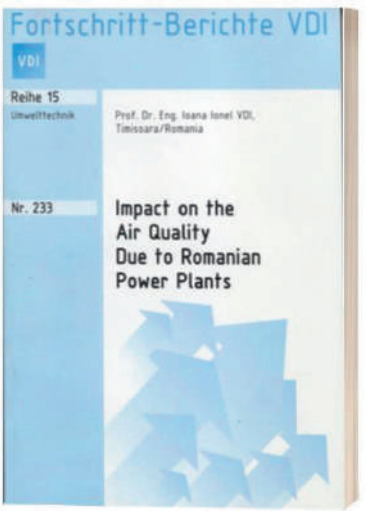
71

IMPACT ON AIR QUALITY DUE TO ROMANIAN POWER PLANTS

(2001)

IOANA IONEL

VDI Verlag GmbH, Dűesseldorf
ISBN: 3-18-323315-0
DOI: 0178-9589



Short description of the book

The book introduces the general tendencies in the energy sector in Romania and some issues concerning the pollution of the environment at the end of the 20th century.

It deals with the impact the Romanian power plants have had, up to 2000, on the air quality, and highlights fundamental theoretical issues, especially the development of pollutants and methods to reduce the concentrations in the flue gas exhaust, by applying specific and up dated technologies for flue gas cleaning (particulates, NO_x, SO_2). Thus, the book proves that air quality control should be an economic and social necessity of any modern society. The analysis reflects the poor situation reviled by online measurements but offers solutions as well. The book addresses basic but also original concepts and results that could interest the technical staff from the power plants, engineers and researchers in the domain of environmental protection, mainly flue gas cleaning and dispersion modelling. It is also a representative information and offers case studies analysis for Romanian power plants, interesting for specialists from abroad, in order to raise their interest to be involved in further sustainable development of the Romanian plants or to invest in the Romanian energy sector. Critical comments of the author rise attention for the need in retrofitting the power plants, especially in efficiency improvement and cleaner combustion, in order to deliver cleaner (thermal and electrical) energy, at best prices. A balance between the material, technical and strategic potential of the Romanian population and modern tendencies should be kept, in order to fulfil both national and international regulation concerning the limitation of pollution in the country and transmitted through the borders.

Book summary

The first chapter (POLLUTION OF THE ATMOSPHERE) leads into main aspects concerning the atmospheric pollution, its relation to climate change, and thermal inversions or other effects. This chapter introduces several main concerns related to global environmental air pollution, its damaging consequences for the natural ecosystem, and describes the major pollutants, their formation, their sources, and their effects and helps to understand the basic nature of eco-systems and how technology affects them.

The next chapter (ENVIRONMENTAL STRATEGY AND DATA SPECIFIC FOR ROMANIA) highlights the environmental strategy from Romania as well as the future tendencies in the energy sector, with special concern for both efficiency increase and environmental protection technologies applied in power plants.

Chapter 3 (AIR POLLUTION CONTROL EQUIPMENT) presents technologies for reducing the particulate emissions, primary and secondary methods for denox of the flue gases exhausted, as well as their desulfurization, by humid, or half humid procedures, according BAT (Best available techniques).

Chapter 4 and 5 are entirely original chapters, bringing solutions based on results of theoretical and experimental investigations, realized in several Romanian power plants, such as Timisoara Sud, Oradea, Halanga. The results were driven from *on situ* flue gas analysis, tested by specific instruments from the environmental protection lab developed by the author at UPT.

The book is based on the habilitation thesis of the author, developed at the Technical University of Munich, as Alexander von Humboldt fellow, under the coordination of professor Roland Meyer Pittroff, and the oral presentation delivered on 11.09.2001, in Fresing-Weihenstephan.

72

CELLULAR AND POROUS MATERIALS IN STRUCTURES AND PROCESSES

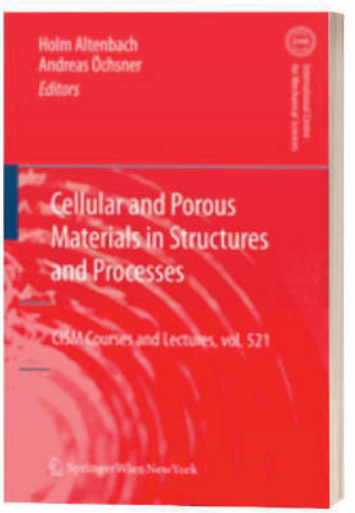
(2010)

LIVIU MARȘAVINA

BOOK CHAPTER PUBLISHED IN FRACTURE MECHANICS OF CELLULAR SOLIDS

HOLM ALTENBACH, ANDREAS ÖCHSNER (EDS.)

SPRINGER
ISBN: 978-3-7091-0296-1
DOI: doi.org/10.1007/978-3-7091-0297-8



Short description of the book

Engineering structures made of porous materials have been used in different applications in the last decades. The book presents the lectures provided in the framework of the course Cellular and Porous Materials: Modeling-Testing-Applications, organized at CISM Udine in 2009 and devoted to cellular and porous materials, including aspects of simulation and modeling of material behavior, structural analysis of structures made of foams, testing and applications. The approaches span three scales: micro-mechanical scale, meso-mechanical scale and macro-mechanical scale.

The book covers the state-of-the-art treatment in modelling and experimental investigation of the mechanical behaviour of cellular and porous materials. Starting from the continuum mechanical modelling, to the numerical simulation, several important questions related to applications such as the fracture and impact behaviour are covered.

The basics of the analysis of structures made of foams is the continuum mechanics. Many structural elements made of foams can be presented like beam, plate of shell models.

The book is addressed to researchers and engineers dealing with characterization, designing and exploitation of complex structures including cellular and porous materials.

Book summary

The chapter *Fracture Mechanics of Cellular Solids*, L. Marsavina, University Politehnica Timişoara, presents the Linear Elastic Fracture Mechanics parameters and criteria, experimental determination of tear strength and fracture toughness, micromechanical models for predicting fracture toughness of cellular materials.

Finite Element Modelling of Cellular Materials, T. Daxner, Vienna University of Technology, describes methods of modeling cellular materials by finite element method, the transition between different mechanical length scales and the optimization of the density distribution in components made from functionally graded foam.

Plasticity of the Three-Dimensional Foams, A. Ochsner, Technical University of Malaysia, presents the elastic behavior of isotropic materials based on generalized Hooke's law, plastic materials behavior using yield criterion and implementation in finite element analysis.

Thin-walled Structures Made of Foams, H. Altenbach & V. Eremeyev, Martin Luther Universitat Halle-Wittenberg. Thin-walled structures made of foams, composites, sandwiches are widely used. The analysis of such structures can be performed on the base of three-dimensional theory, but also a lower dimension theory.

Plasticity Theory of Porous and Power Metals, S. Alexandrov, Russian Academy of Science, Moscow. The flow formulation was adopted. Qualitative behavior of solutions based on various models of pressure – dependent plasticity is considered by means of closed-form solutions.

Impact of Cellular Materials, H. Tan, University of Aberdeen & S. Qu, Zhejiang University. Cellular materials are used as impact energy absorbers. Plastic shock waves and shock arrest are investigated analytically for longitudinal impacts.

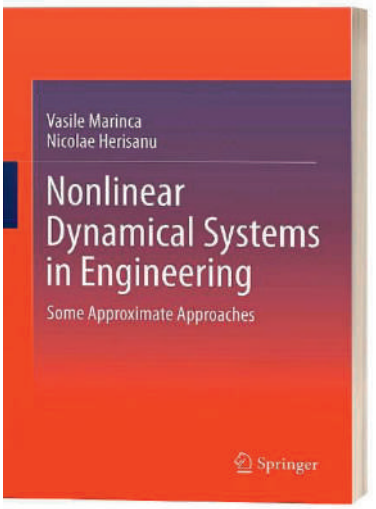
73

NONLINEAR DYNAMICAL SYSTEMS IN ENGINEERING. SOME APPROXIMATE APPROACHES

(2011)

Vasile Marinca, Nicolae Herişanu

SPRINGER
ISBN: 978-3-319-15373-5
DOI: 10.1007/978-3-319-15374-2



Short description of the book

The material of this book is intended to serve as an advanced support for courses which involve nonlinear dynamical systems, such as the theory of nonlinear oscillations, the theory of electrical machines, classical mechanics and fluid mechanics, thermodynamics or even biology. The prerequisites for studying dynamical systems using this book are undergraduate courses in linear algebra, real and complex analysis, dynamics and ordinary differential equations, classical physics of oscillations, and besides, knowledge of a mathematical software would be essential. Also, readers of this book should know basic notions about nonlinear systems of differential equations including plotting of phase portraits, analysis of nonlinear systems and graphical representation of errors and so on. The main aim of this book is to present and extend different known methods in the literature, especially Lindstedt-Poincare method, the method of harmonic balance, the method of Krylov-Bogolyubov and the method of multiple scales, to solve different types of strong nonlinearities. A better knowledge of these methods leads to a better choice of the so-called "base functions" which are absolutely necessary to obtain the auxiliary functions involved in the last Chapters, devoted to some optimal analytical approaches proposed for the first time by the authors of this book.

Book summary

The book is divided into eight chapters. The text begins with some known procedures, presented in Chapters 1–4: the Lindstedt-Poincare method, the method of harmonic balance, the method of Krylov-Bogolyubov and the method of multiple scales. All these techniques suppose the presence of a small parameter into the governing nonlinear equations. There are

presented some alternatives and examples to each of these approaches, such as the use of perturbation method for strong parameter, the rational harmonic balance method, a combination of the method of Krylov-Bogolyubov and iteration method. The last four chapters, from 5 to 8 are devoted to optimal approaches proposed for the first time in the literature by the authors of this book, such as: the Optimal Homotopy Asymptotic Method (OHAM), the Optimal Homotopy Perturbation Method (OHPM), the Optimal Variational Iteration Method (OVIM) and the Optimal Parametric Iteration Method (OPIM). The validity of the proposed procedures has been demonstrated on some practical examples and very good agreement was found between the approximate analytic results and numerical simulations. The convergence of the approximate solutions obtained by each of these new methods is greatly influenced by the convergence-control parameters, which are optimally determined. These methods are very rapid and effective and show their validity and potential for the solution of nonlinear problems arising in dynamical systems.

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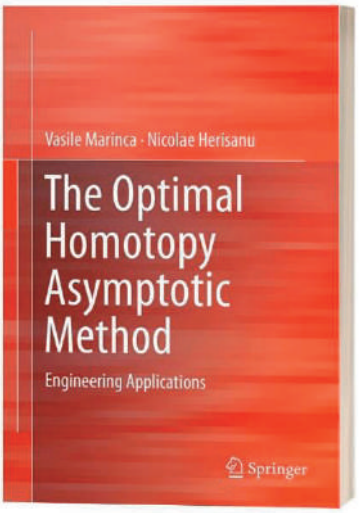
THE OPTIMAL HOMOTOPY ASYMPTOTIC METHOD. ENGINEERING APPLICATIONS

(2015)

Vasile Marinca, Nicolae Herișanu

SPRINGER
ISBN: 978-3-319-15373-5
DOI: 10.1007/978-3-319-15374-2



Short description of the book

The book primarily aims to allow the reader to learn and gain a comprehensive understanding of nonlinear problems analytically solved by means of a new and reliable analytical technique, namely the Optimal Homotopy Asymptotic Method (OHAM), which is a method proposed for the first time in the literature by the authors of this book in 2008. This book was written with the motto: "There is always more to discover about nonlinear dynamical systems", and this proves to be true. This book is mainly written for researchers, engineers, natural scientists and PhD students studying engineering, and may be also used by physicians and mathematicians interested by nonlinear dynamical systems. We assume that the reader has some prior knowledge on linear differential equations, integrals, trigonometric functions, polynomials, series expansions, and algebraic calculus. The book contains a great amount of models and it is intended to serve as an access point to the basic concepts of nonlinear dynamical systems and thereby should stimulate the interest of researchers in engineering, with a special focus on the application of a new analytical approach which always lead to accurate explicit analytical solutions.

Book summary

The book is divided into five chapters. The first chapter is introductory, emphasizing the role and the place of nonlinear dynamical systems, and also a short history of the developments in this field of research. The second one is devoted to a short history of the development of homotopy and gives the basic ideas of the proposed analytical technique, which was developed in time under more alternatives. The third chapter deals with the first alternative

of the optimal homotopy asymptotic method with two iterations. The fourth chapter treats the optimal homotopy asymptotic method with a single iteration and solving the linear equation in the first approximation. The last chapter is devoted to the optimal homotopy asymptotic method with a single iteration but without solving the equation in the first approximation. The whole book contains practical examples from various domains of engineering, physics or applied mathematics. All the analytical developments within the above-mentioned chapters are accompanied by numerical developments, so that, for validation purposes, the analytical results are always compared with numerical or even with exact results or with other known results in the literature.

75

OBOSEALA CONDUCTOARELOR LINIILOR ELECTRICE AERIENE

[FATIGUE OF OVERHEAD POWER LINE CONDUCTORS]

(2017)

ANGHEL CERNESCU, ION DUMITRU

EDITURA ACADEMIEI ROMÂNE
ISBN 978-973-27-2783-6

Short description of the book

The *Fatigue of overhead power lines conductors* monograph is a continuation of a research tradition of the Politehnica University of Timisoara in the field of mechanical strength of conductors and cables. The book addresses a new field regarding the fatigue life of the conductors in the presence of variable amplitude loadings generated by the wind vibrations. Thus, designers, electric conductor manufacturers and those exploiting the overhead power lines are provided with a basic material for understanding and deepening the fatigue phenomenon generated by wind vibrations. The high scientific level of this book is based on considerable amount of bibliographic data, the latest computing methods and a vast experience of the authors. The cracking and fracture mechanisms of the wires in the contact area between the conductor and the clamping support are described through the notions of fretting fatigue.

Also, a series of theoretical and experimental contributions are presented in the book with the purpose of implementing within the Mechanics and Strength of Materials lab of the new techniques for fatigue life evaluation of overhead power line conductors. Based on the proposed experimental method, the authors performed a first fatigue analysis of a 13m long conductor (122-AL1/20-ST1A) in the presence of variable amplitude loads that simulate wind vibrations.

Book summary

Systematization of the material is done in such a way that the chapters follow a logical sequence that facilitates the understanding of the problems described. The book includes seven chapters as follows: Chapter I describes the importance and need to address the fatigue phenomenon of overhead power line conductors, types of conductors, their components, materials, mechanical characteristics, etc. Chapter II shows generalities regarding the mechanics of overhead power line conductors, deformation curve of the mounted conductor and respectively the mechanical behaviour of the conductor itself. Chapter III describes the fretting fatigue phenomenon. In chapter IV are presented characteristics of the vibrations of overhead power line conductors. Chapter V presents the fatigue damage mechanisms of overhead power line conductors, methods of bending stiffness calculation, stress state and the fatigue curves of the conductors. Chapter VI describes methods for fatigue life prediction of the conductors. The chapter includes techniques for recording and processing of vibration spectra and their transposition into counting methods of cumulative damage. Chapter VII presents the implementation in the Mechanics and Strength of Materials Lab of a methodology for assessing the mechanical behaviour and fatigue of overhead power line conductors.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.4. MECHANICAL ENGINEERING, MECHATRONICS, INDUSTRIAL ENGINEERING
1.4.2. INDUSTRIAL ENGINEERING

76

DMAIC SIX SIGMA FOR IMPROVING COMPLEX PROCESSES

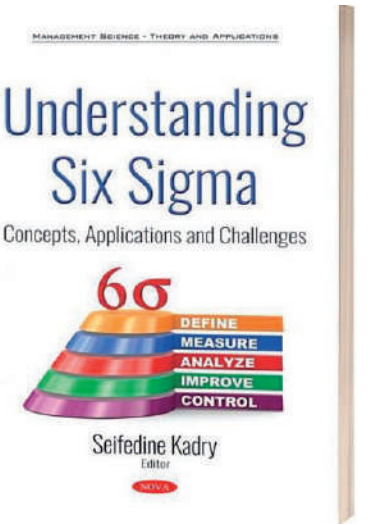
(2018)

ADRIAN PUGNA, SABINA POTRA,
ROMEO NEGREA, MARIAN MOCAN

BOOK CHAPTER PUBLISHED IN UNDERSTANDING SIX SIGMA CONCEPTS, APPLICATIONS AND CHALLENGES

SEIFEDINE KADRY (EDS.)

Nova Science Publishers, Inc. New-York
ISBN: 978-1-53614-174-0



Short description of the book

Understanding Six Sigma: Concepts, Applications and Challenges includes seven excellent chapters that have been prepared using state-of-the-art methodologies by professional researchers in this domain from seven different countries. The chapters in the book are the following:

"Sustainable Development of the Environment Using Six Sigma" – *Seifedine Kadry,* Mathematics and Computer Science Department Faculty of Science, Beirut Arab University, Lebanon; "DMAIC Six Sigma for Complex Processes Improvement" – *Adrian Pugna, Sabina Potra, Romeo Negrea and Marian Mocan,* Politehnica University of Timisoara, Romania ; "The Lean Six Sigma Methodology: Applications in Thoracic Surgery" – *Luca Bertolaccini, MD, PhD, Barbara Bonfanti, MD, Jury Brandolini, MD, Francesca Calabrese, MD, Sergio Nicola Forti Parri, MD, Kenji Kawamukai, MD, Nicola Lacava, MD and Piergiorgio Solli, MD, PhD* Department of Thoracic Surgery, Maggiore Teaching Hospital, Bologna, Italy; "The Link between Six Sigma and Business Performance" – *Khaled Mili,* High Institute of Management, Sousse, Tunisia and *Abdelmonem Snoussi,* Higher Institute of Finance and Taxation, Sousse, Tunisia; "Integration of the Lean and Six Sigma Methodology to Improve Quality Performance in a Healthcare Organisation" – *Selim Ahmed,* World School of Business, World University of Bangladesh Dhaka, Bangladesh ; "Six Sigma: A Process Improvement Methodology" – *Swati C. Jagdale, Asawaree A. Hable, M Pharm,* MAEER's Maharashtra Institute of Pharmacy, Department of Pharmaceutics, Savitribai Phule Pune University, Pune, MH, India *and Anuruddha R. Chabukswar,* MAEER's Maharashtra Institute of Pharmacy, Department of Pharmaceutical

Chemistry, Savitribai Phule Pune University, Pune, MH, India; and "Integrating Six Sigma into a Business Strategy: Workshop and Leadership" – *Jung-Lang Cheng*, Department of Industrial Engineering and Management, Cheng Shiu University, Niasosong, Kaohsiung, Taiwan.

Chapter summary

Achieving a high degree of performance through continuous improvement is a desideratum of all companies because it ensures their success in ever-changing contemporary markets. Quality improvement theory has seen the emergence of several programs, such as Six Sigma, Total Quality Management, ISO Type Certification, Agile & Lean Manufacturing, Re-engineering, Process Excellence etc. But in the case of complex processes, the introduction and application of the Six Sigma methodology has proved most successful. The reason for this outcome can be the fact that Six Sigma incorporates the TQM philosophy and tools, offers a structured improvement model (DMAIC) with more advanced statistical tools and involves the top management through its belts system with the final purpose to tackle complex projects. Moreover, the application of the Six Sigma methodology is the one that creates a strong culture of continuous improvement. This chapter presents a solution for a complex process improvement in an automotive company in Romania by using DMAIC Six Sigma methodology.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

1

ENGINEERING SCIENCES

1.4. MECHANICAL ENGINEERING, MECHATRONICS, INDUSTRIAL ENGINEERING
1.4.3. MATERIALS ENGINEERING

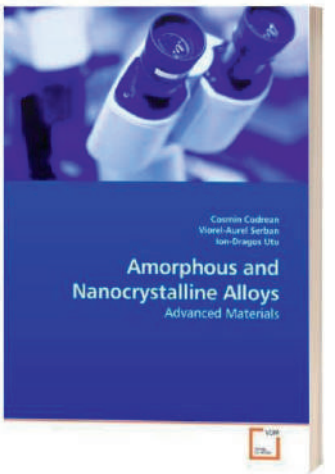
77

AMORPHOUS AND NANOCRYSTALLINE ALLOYS

(2009)

COSMIN CODREAN, VIOREL-AUREL ŞERBAN,
ION-DRAGOS UTU

VDM Verlag Dr. Müller
ISBN: 978-3-639-19845-4



Short description of the book

The book "Amorphous and nanocrystalline alloys represents a summary of studies and investigations realized by collective researchers from Romania and abroad in amorphous and nanocrystalline metallic alloys, approaching problems about the new materials structure and about the thermodynamic and formation kinetic of amorphous and nanocrystalline structures. Also, presentations are made on processing methods, exploitation properties and actual and long-term application domains.

In addition to these new materials, there are also metallic alloys with metastable structures (amorphous, quasicrystalline, nanocrystalline), which through a series of mechanical, physical and chemical properties, are required in top-level technical fields.

The book is primarily addressed to the students from „Materials engineering" domain who have in their curriculum the "Amorphous and nanocrystalline metals " course, as well as for the Master students at the specialization "Computer-aided design of advanced mechanical systems", who have in their curriculum the course "Materials engineering of high level", in which a chapter is destined to the amorphous and nanostructured metals.

It is also addressed to the students from the related technical fields (mechanical engineering, industrial engineering, transport engineering) to complement the "Material science" course, being a real use to everyone who is interested in the metallic materials' domain.

Book summary

The first chapter of the book presents particularities of amorphous and nanocrystalline structure specific to the advanced metallic materials. It synthetises the structural models developed for the description of the space distribution of the atoms. Also, some modern characterization methods of these materials' structural states are presented.

The second chapter reveals thermodynamic and kinetic of amorphous and nanocrystalline structure formation. The main factors which influence the amorphization and nanocrystallization of the metallic alloys are presented.

The third chapter describes the methods used for the manufacturing of amorphous and nanocrystalline metallic alloys. The large-scale industrial production of these materials can only be achieved by continuous processing of rapid quenching which have the advantage that the materials are produced by direct casting and not by rolling and drawing bulk shapes.

The thermal stability of the amorphous metals is described in chapter four, which presents information about the appreciation of the temperature and activation energy of the amorphous phase crystallization. The type and kinetics of the crystallisation process for the metallic glasses are presented.

The fifth chapter presents the properties of the amorphous and nanocrystalline metallic alloys. These materials have exceptional characteristics, non-associated in such a way in every well-known material.

The last chapter of the book highlights the importance of these materials for different industrial applications (core transformers, electromagnetic filters, reinforcement materials for composites, hydrogen absorbers, brazing alloys, etc)

SCIENTIFIC
BOOKS
IN HIGHLIGHT

2

MATHEMATICS AND NATURAL SCIENCES

2.1. MATHEMATICS

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HANDBOOK OF NUMBER THEORY I

(2006)

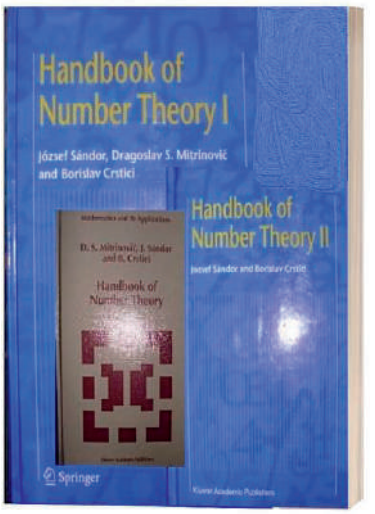
JOZSEF SÁNDOR, DRAGOSLAV S. MITRINOVIĆ AND BORISLAV CRSTICI (EDS.)

HANDBOOK OF NUMBER THEORY II

(2006)

JOZSEF SÁNDOR AND BORISLAV CRSTICI (EDS.)

Kluwer Academic Publishers, Dordrecht/ Boston/London
ISBN 1-4020-2546-7 (HB)
ISBN 1-4020-2547-5 (e-book)



Short description - Handbook of Number Theory I

The aim of this book is to systematize and to present in an easily accessible framework the most important results from some parts of Number Theory, which are expressed by inequalities or by estimates.

This book focuses on the most important arithmetic functions in Number Theory, such as $\phi(n)$, $\sigma(n)$, $d(n)$, $\omega(n)$, $\mu(n)$, $\pi(n)$, $P(n)$,$\psi(x, y)$ and so on, together with various generalizations, analogues and extensions of these functions, and also properties of some functions related to the distribution of the primes and of the quadratic residues and to partitions, etc. It is sufficient to take a look at the contents in order to realize the variety of the approached subjects in each chapter. The chapters are divided in consecutive "themes." Each theme expresses properties which are similar or contiguous by their nature.

We attempted to make a selection which reflects the current situation in the domain regarded. On the other hand, as a basic characteristic of this book, we included the results of the pioneers in the domains regarded, as well as some results reflecting the evolution from the pioneer works up to recent ones. Our aim was to give the most precise references, i.e. original ones, even when the results are standard and can be found in textbooks. To this purpose, we have used a wealth of literature, consisting of books, monographs, journals, reviews from *Mathematical Reviews* and from *Zentralblatt für Mathematik* etc.

The first chapter starts from elementary inequalities for Euler's φ function, dealing with relations and inequalities between φ, σ and d and ends with asymptotic formulae for generalized Euler functions.

In the second chapter one can read about divisibility, majorization for $\log d(n)/\log 2$, largely composite numbers, divisor sums on squarefree or squarefull integers and the distribution function of $d(n)$.

Elementary inequalities on $\varphi(n)$ and $\varphi(n)/n$, divisibility and congruences properties of $\sigma_k(n)$, k-perfect numbers, unitary perfect numbers, bi-unitary perfect numbers, unitary harmonic numbers, all these subjects are discussed in the third chapter.

Topics on $p(n!+1)$, $P(n!+1)$, $P(F_n)$, sums on $1/p(n)$, $\omega(n)/p(n)$, $d(n)/p(n)$, density of reducible integers, numbers n with the property $B(n) = B(n+1)$ are all presented in the fourth chapter.

Chapter five contains, among others, sums over $(\omega(n) - \log\log x)2$, sums over $\lambda(n) = (-1)^{\Omega(n)}$, estimates of type $\omega(n) \leq c \cdot \log n/\log\log n$, Gaussian Law of errors for ω, sumsets with many prime factors.

The sixth chapter deals with estimates for $M(x)$. Mertens' conjecture, Möbius function of order k, Schnirelmann density and distribution of the k-free integers and asymptotic formulae for powerful numbers.

Estimates on $\pi(x)$, Chebyshev's theorem, the prime number theorem, number of primes $p \leq x$ for which $p + k$ is a prime and related questions as well as primes between x and $a \cdot x$, ($a > 1$, constant), Bertrand's Postulate are some of the topics approached in the seventh chapter.

In chapter VIII, several theorems are presented, such as Dirichlet's theorem on arithmetic progressions, Linnik's theorem, Siegel-Walfisz theorem, Bombieri-Vinogradov theorem, and Brun-Titchmarsh theorem.

For chapter IX, the authors chose several others well known theorems and problems like Schnirelman's theorem, Vinogradov's theorem, Renyi's theorem, Chen's theorem, Hardy-Littlewood problem, Goldbach's problem, and Linnik's theorem.

Chapter X is dedicated to presenting some methods on exponential sums such as Weyl's method, Van der Corput's method, Vinogradov's method, Hua's estimate, Salie's and Weil's estimates.

In chapter XI, one can find different types of character sums and the properties such sums have. A few special types of results are given here by Selberg and Motohashi, Wolke, Hecke and Kloosterman.

Chapter XII deals with problems related to binomial coefficients and factorization. Results on these issues had Sylvester and Schur, Pillai and Szekeres, Erdos-Rankin and Shorey.

Different types of representations and estimates, both statistical and probabilistic, are given for finite groups and semi-simple rings in chapter XIII.

Chapter XIV is dedicated to partitions. Problems like those of Frobenius, Abel-Tauber and Turan and Kalmar's "factorisatio numerorum", to name a few, are studied here.

Chapter XV contains residues both quadratic and non-quadratic, distributions concerning the Legendre symbol, Fibonacci primitive roots, Waring's problem and many more.

In Chapter XVI one can observe a set of theorems, like those belonging to Erdos, Turan-Kubilius, Erdos-Kac, Erdos-Wintner, applicable to additive and multiplicative function.

Short description - Handbook of Number Theory II

The aim of this book is to systematize and survey in an easily accessible manner the most important results from some parts of Number Theory, which are connected with many other fields of Mathematics or Science. Each chapter can be viewed as an encyclopaedia of the considered field, with many facets and interconnections with virtually almost all major topics as Discrete mathematics, Combinatorial theory, Numerical analysis, Finite difference calculus, Probability theory; and such classical fields of mathematics as Algebra, Geometry, and Mathematical analysis.

This book focuses too, as the former volume, on some important arithmetic functions of Number Theory and Discrete mathematics, such as Euler's totient $\phi(n)$ and its many generalizations; the sum of divisors function $\sigma(n)$ with the many old and new issues on Perfect numbers; the Mobius function, along with its generalizations and extensions, in connection with many applications; the arithmetic functions related to the divisors, consecutive divisors, or the digits of a number. The last chapter shows perhaps most strikingly the cross-fertilization of Number theory with Combinatorics, Numerical mathematics, or Probability theory.

The style of presentation of the material differs from that of our former volume, since we have opted here for a more flexible, conversational, survey-type method. Each chapter is concluded with a detailed and up-to-date list of References, while at the end of the book one can find an extensive Subject index.

Chapter 1. Perfect Numbers: Old and New Issues; Perspectives
The aim of the first chapter is to survey the most important and interesting notions, results, extensions, generalizations related to perfect numbers. Many old, as well as new open problems will be stated, which will motivate - we do hope - many further research. This is one of the oldest subjects of Mathematics, with a considerable history. Some basic historical facts will be presented, as this will underline too our strong opinion on the role of perfect numbers in the development of Mathematics.
Chapter 2. Generalizations and Extensions of The Mobius Function
In chapter 2 we will survey many generalizations in Number theory of the Mobius function, as well as analogues functions which arose by the extensions of certain divisibility notions or product notions of arithmetical functions. Our study will include also Mobius functions in Group theory, Lattice theory, partially ordered sets or Arithmetical semigroups.

Chapter 3. The Many Facets of Euler's Totient

The third chapter is dedicated to inequalities and estimates connecting the Euler's indicator ϕ to the arithmetical functions d (number of divisors), σ (sum of divisors), ω (number of distinct prime divisors), K (Jordan's function), ψ (Dedekind's function), etc.

Chapter 4. Special Arithmetic Functions Connected with The Divisors, or With the Digits of a Number

There are many particular arithmetic functions, numbers or sequences connected with some important notions or results which appear in Number theory, and in fact all Mathematics. Some of them are nonstandard functions (such as d, σ, ϕ, μ, ω, p, P, etc.) and were studied in the former chapters of this book. The aim of chapter 4 is the study of some other functions which at one part are not so well-known and are scattered in various fields of study.

Chapter 5. Stirling, Bell, Bernoulli, Euler and Eulerian Numbers

Chapter 5 is divided into two major parts: Stirling and Bell numbers, and Bernoulli, Euler and Eulerian numbers. These classical topics occur in practically every field of mathematics, in particular in combinatorial theory, finite difference calculus, numerical analysis, number theory, and probability theory. Our aim is to study the many aspects of these numbers, and to point out important connections or applications in number theory and related fields.

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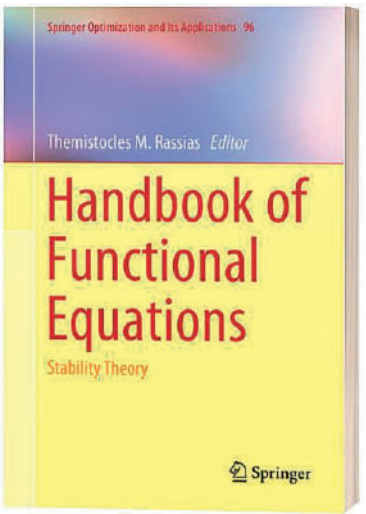
GENERALIZED ULAM–HYERS STABILITY RESULTS: A FIXED POINT APPROACH

(2014)

LIVIU CĂDARIU

BOOK CHAPTER PUBLISHED IN HANDBOOK OF FUNCTIONAL EQUATIONS – STABILITY THEORY
THEMISTOCLES M. RASSIAS (EDS.)

SPRINGER
ISBN 978-1-4939-1286-5



Short description of the book

The book presents expository and survey chapters that include recent developments, open questions and new research directions. It contains contributions from leading experts in mathematics and engineering with an emphasis on functional equations and their applications.

This handbook consists of seventeen chapters written by eminent scientists from the international mathematical community, who present important research works in the field of mathematical analysis and related subjects, particularly in the Ulam stability theory of functional equations. The book provides an insight into a large domain of research with emphasis to the discussion of several theories, methods and problems in approximation theory, analytic inequalities, functional analysis, computational algebra and applications.

The notion of stability of functional equations has its origins with S. M. Ulam, who posed the fundamental problem for approximate homomorphisms in 1940 and with D. H. Hyers, Th. M. Rassias, who provided the first significant solutions for additive and linear mappings in 1941 and 1978, respectively. During the last decade the notion of stability of functional equations has evolved into a very active domain of mathematical research with several applications of interdisciplinary nature.

The chapters of this handbook focus mainly on both old and recent developments on the equation of homomorphism for square symmetric groupoids, the linear and polynomial functional equations in a single variable, the Drygas functional equation on amenable semigroups, monomial functional equation, the Cauchy–Jensen type mappings, differential

equations and differential operators, operational equations and inclusions, generalized module left higher derivations, selections of set-valued mappings, D'Alembert's functional equation, characterizations of information measures, functional equations in restricted domains, as well as generalized functional stability and fixed point theory.

Chapter summary

Starting from a question of S. M. Ulam concerning the stability of group homomorphisms, D. H. Hyers gave a purely constructive solution in the case of Cauchy functional equation in Banach spaces. The Hyers' result was generalized by T. Aoki for approximately additive mappings and by Th. M. Rassias for approximately linear mappings. P. Găvruța obtained a generalization of Th. M. Rassias theorem, by replacing the Cauchy differences by a control mapping satisfying a simple condition of convergence. These papers had a great influence in the development of what is now known as generalized *Hyers-Ulam-Rassias stability of the functional equations*. Almost all proofs in this topic used the direct method (of Hyers): the exact solution of the functional equation is explicitly constructed as a limit of a sequence, starting from the given approximate solution f. On the other hand, J. A. Baker used in 1991 the Banach fixed point theorem to give Hyers-Ulam stability results for a nonlinear functional equation. In 2003, V. Radu & L. Cădariu proposed a new method to obtaining the existence of the exact solutions and the error estimations, based on the fixed-point alternative.

A new trend in the field of Ulam-Hyers stability focuses on general methods allowing to obtain stability results for large classes of functional, differential and integral equations, in various spaces. For example, some fixed points theorems for operators (not necessarily linear) satisfying suitable very general properties have been proved recently. After that, these outcomes were used to obtain properties of stability, hyperstability, superstability for different classes of functional equations. In this context, J. Brzdęk et al. proved in 2011 a fixed-point theorem for (not necessarily) linear operators and they used it for proving Hyers-Ulam stability results for a class of functional equations in a single variable. These results were extended in the paper [Cădariu L., Găvruța, L., Găvruța, P. - Fixed points and generalized Hyers-Ulam stability, Abstract Applied Analysis 2012, Article ID 712743, 10 pages, (2012)]. Moreover, they gave an affirmative answer to the open problem of J. Brzdęk et al., concerning the uniqueness of the fixed point of the same operator.

In this chapter it is proved that the above mentioned fixed point result of Cădariu L., Găvruța, L., Găvruța, P. can be used to prove some generalized Ulam - Hyers stability theorems for additive Cauchy functional equation as well as for the monomial functional equation, in β-normed spaces. Following the ideas from this chapter, the generalized Ulam-Hyers stability properties for a large class of functional equations (Cauchy and Jensen, quadratic, cubic, quartic, quantic) can be obtained directly from the Proposition 1, for suitable operator T and mapping Λ. Moreover, several results of generalized stability for functional equations in a single variable as well as for *p-Drygas* functional equation can be obtained by the same method.

The method presented in this chapter led to the identification of several classes of functional equations whose generalized Ulam-Hyers stability properties can be obtained directly by suitable fixed-point theorems.

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2

MATHEMATICS AND NATURAL SCIENCES

2.2. CHEMISTRY

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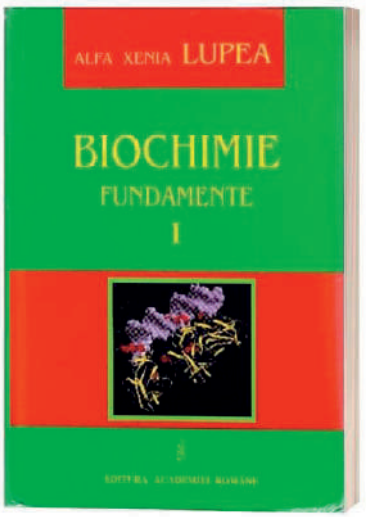
BIOCHIMIE. VOL. I: FUNDAMENTE

[BIOCHEMISTRY. VOL. I: FUNDAMENTALS]

(2007)

ALFA-XENIA LUPEA
EDITURA ACADEMIEI ROMÂNE
ISBN 978-973-27-1368-6

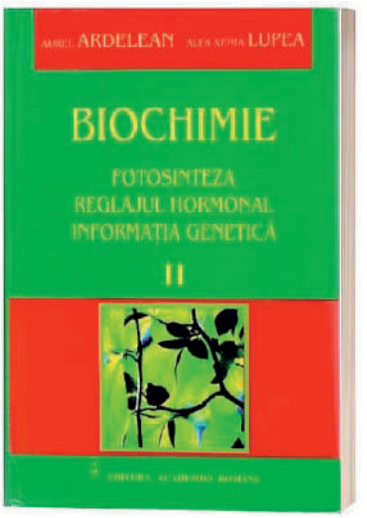


BIOCHIMIE. VOL. II: FOTOZINTEZA, REGLAJUL HORMONAL, INFORMAȚIA GENETICĂ

[BIOCHEMISTRY. VOL. II: PHOTOSYNTHESIS, HORMONAL CONTROL, GENETIC INFORMATION]

(2007)

AUREL ARDELEAN, ALFA-XENIA LUPEA
EDITURA ACADEMIEI ROMÂNE
ISBN 978-973-27-1369-3



Short description of the book

The purpose of the present book is to offer complete, thought non-encyclopaedic information, about major subjects of biochemistry. The basic idea was to build a clear and organized text which emphasizes the subjects with the chemical engineer rigor completed with the understanding of main life phenomena of a biologist, so that the reader at the end of the study may understand the complexity of the life processes based on chemical reactions at

the living cell level. The first volume is dedicated to basic subjects of biochemistry (Fundamentals) whereas the second one is focused on special chapters with strong link to biology (Photosynthesis, Hormonal control, Genetic information). The book is not addressed only to experts in the field of biochemistry and biology but also to students (bachelor, master or Ph.D.) whose main specialization imply strong knowledge in this domain.

Book summary - *BIOCHEMISTRY. Vol. I: Fundamentals*

The first volume is organized in eight chapters and a short introduction in the fields:
The **Introduction** offers a general image of biochemistry, bioenergetics and cell, and an explanation of the organization of the next chapters.

Chapter 1 explains the cell architecture as a basic component of living organisms. Biomolecules, supramolecular structures and cell organelles are presented as main components of a cell correlated with the biochemical reactions.

Chapter 2 is dedicated to cell energetics as an application of thermodynamics in biochemistry. Basic thermodynamic principles enthalpy, entropy, free energy are discussed. The thermodynamics of ATP/ADP system, the proton translocation that is powered by electron transport are described as resulting from either redox loops or proton pumps.

Chapter 3 Provides information about water and mineral elements together with acid-base processes in living organisms.

The next three chapters: **Chapter 4** "Proteins", **Chapter 5** "Carbohydrates" and **Chapter 6** "Lipids" are organized on the same structure: descriptive biochemistry on one side and metabolism with catabolism and biosynthesis of the mentioned molecules. Due to the structural complexity of proteins, chapter 4 is also focused on their separation, purification and structural analysis.

Chapter 7 is focused on "Enzymes", basic catalysts in biochemical and chemical reactions in cells explaining their structure, reaction specificity and enzymatic kinetics.

Chapter 8 describes two classes of chemical compounds: "Vitamins and Coenzymes". These work together with enzymes to help them in catalytic biochemical processes.

Book summary - *BIOCHEMISTRY. Vol. II: Photosynthesis, Hormonal Control, Genetic Information*

Chapter 1 is an overview of metabolic pathways and energy metabolism strategies. The focus is on mammalian metabolism mentioning the interesting variations in other type of organism.

Chapter 2 provides a basic introduction to photosynthesis as the process of light converting into chemical energy and storing in the bonds of carbohydrates in the case of green plants and come algae types. The photosynthesis mechanism and the essential reactions to transform light energy are presented.

Chapter 3 is focused on molecular basis of hormone action. The hormones interact first with plasma membranes of cells. The action mechanisms of polar and nonpolar hormones, protein, phosphorylation, cyclic AMP and the second messenger model are presented.
Chapters 4, 5 and **6** provides the main role that nucleotides and nucleic acids play in biochemistry.

Chapter 4 emphasizes the nucleotide components, the nucleotide metabolism, synthesis of purine-, pyrimidine-nucleotides, other functions of nucleotides and their role in chemotherapy.

Chapters 5 and 6 explains the nucleic acid structures, chemical forces stabilizing nucleic acid structures, fractionation of nucleic acids, nonenzymatic transformation of nucleotides and nucleic acids, double helix structure, DNA, secondary and tertiary structure of ribonucleic acids RNA.

Chapter 7 provides information about nucleic acid sequencing. Chemical cleavage methods of nucleic acids are followed by the chemical synthesis of oligonucleotides and enzymatic replication of DNA sequences.

Chapter 8 is a presentation of DNA replication, with a set of fundamental rules of replication. Damage and repair of DNA and recombination are also presented.

Chapter 9 describes the RNA transcription.

Chapter 10 is dedicated to protein translation and biosynthesis. The genetic code, its characteristics and stages of protein synthesis are presented.

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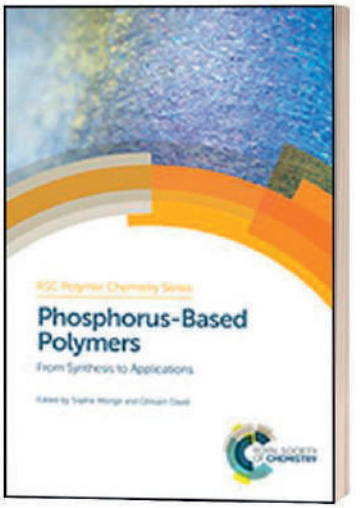
USE OF PHOSPHOROUS-CONTAINING POLYMERS FOR THE REMOVAL OF METAL IONS FROM WASTE WATERS



(2014)

LAVINIA LUPA, ADRIANA POPA, GHEORGHE ILIA

BOOK CHAPTER PUBLISHED IN PHOSPHOROUS-BASED POLYMERS: FROM SYNTHESIS TO APPLICATIONS

SOPHIE MONGE, GHISLAIN DAVID (EDS.)

ROYAL SOCIETY OF CHEMISTRY
ISBN 978-1-84973-646-6
DOI 10.1039/9781782624523-00225

Short description of the book

The book presents a compressive overview of phosphorous-containing polymers including phosphorus containing (meth) acrylate, (meth) acrylamide and vinyl or allyl monomers, as well as vinyl-phosphonic acid, 2-methacryloyloxyethyl-phosphorylcholine, poly (phospho-esters), and polyphosphazene and their use in a wide range of areas. After an exhaustive explanation of their synthesis and characterization of these types of polymers, in the second part of the book, their different applications are presented, such as: biomedical applications in dental materials, tissue engineering and drug delivery, metal complexation for anti-corrosive materials and waste water purification, flame retardant additives and cell membranes, combustible. Written by experts in phosphorus-containing polymer chemistry, this book is suitable for academic and industrial researchers interested in the synthesis of polymer and materials, as well as for their applications.

Chapter summary

The removal of heavy metals from various industrial waste effluents, before discharging the effluent, is a global environmental concern. In this chapter, the advantages of the use of natural and synthetic chelating resins in the removal of various metal ions from aqueous solutions are presented. The chelating resins were obtained by the chemical modification of their surface with different phosphorus pendant groups. One may notice that the modification of the polymeric matrix through phosphorylation of its surface with different phosphorus pendant groups leads to an increase in the adsorption efficiency of the polymer in the removal of metal ions from various aqueous solutions. It was observed that the selectivity for various metal ions and the maximum adsorption capacity of the functionalized polymer depended on the type of the functionalized groups grafted on the polymeric matrix, the properties of the ion-exchange/coordination resin, and the phosphorylation conditions. In conclusion, the use of a functionalized polymer with various types of phosphorus pendant groups showed good feasibility in the removal of metal ions from different aqueous solutions.

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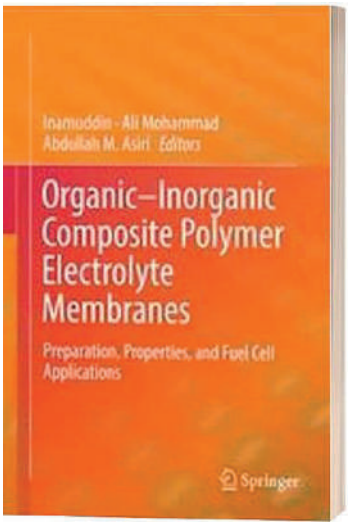
A BASIC OVERVIEW OF FUEL CELLS: THERMODYNAMICS AND CELL EFFICIENCY



(2017)

NARCIS DUȚEANU, ADRIANA BALASOIU, PRITHA CHATTERJEE, MAKARAND M. GHANGREKAR

BOOK CHAPTER PUBLISHED IN ORGANIC-INORGANIC COMPOSITE POLYMER ELECTROLYTE MEMBRANES

DR INAMUDDIN, ALI MOHAMMAD, ABDULLAH M. ASIRI (EDS.)

SPRINGER
ISBN 978-3-319-52739-0
DOI 10.1007/978-3-319-52739-0_8

Short description of the book

The present book explores the latest developments in the area of polymer electrolyte membranes (PEMs) used for construction of high-temperature fuel cells. During all 17 chapters, several aspects are presented, such as a unified viewpoint regarding the operating principle of the fuel cells, different technologies used for production of polymer electrolyte membranes, different issues relates to the membranes, chemical and mechanical stabilities. A special attention was paid to the preparation of nanocomposite membranes.

This book represents a viable instrument for researchers and students interested into the fuel cell technology, and specially for persons which intend to deeper understand the organic–inorganic membranes used in fuel cells, membrane fabrication methodologies, properties and clean energy applications.

Chapter summary

In the last century, due to the aggressive urbanization and industrialization a high increase of the energy consumption was observed. Such consumption can be assured by increasing the load on non-renewable resources with a subsequent escalation of pollution. A viable solution to these two problems can be represented by the development of a new power supply technology that can generate energy with zero or minimum pollutant emission into the environment. In this context, fuel cell technology appears to be an eco-friendly and sustainable power supply technology. One of the major advantages of such technology is represented by the possibility to direct the conversion of the different fuels into electrical energy. When hydrogen is used as fuel, energy is produced with zero emissions. Present book chapter describe the basic overview of the fuel cell technology in order to better understand the construction and the working principle of this eco-friendly power supply systems.

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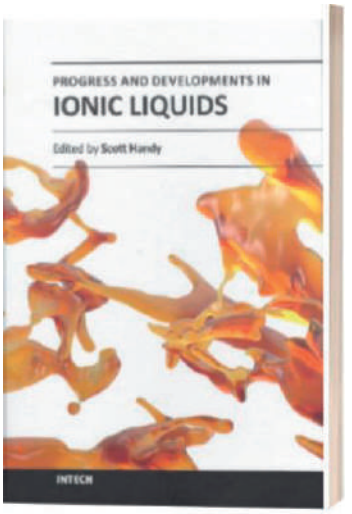
USE OF IONIC LIQUIDS IN SOLID-LIQUID SEPARATION PROCESSES



(2017)

LAVINIA LUPA, PETRU NEGREA, ADRIANA POPA

BOOK CHAPTER PUBLISHED IN PROGRESS AND DEVELOPMENTS IN IONIC LIQUIDS

SCOTT HANDY (ED.)

INTECH
ISBN 978-953-51-2901-1
DOI 10.5772/65890

Short description of the book

The book underlines the importance and advantages of ionic liquids uses in a variety of applications: from traditional areas (organic and material synthesis, electrochemistry and physical property studies) to less obvious areas such as lubrication and enzymatic transformations. Therefore, the book brings together recent researches and reviews studies regarding the properties of ionic liquids, their use in absorption heat and gas sensing, their role in proteins and different synthesis, in various electrochemistry processes, and application in various separation and purification processes. The book also offers new insights into the future uses of ionic liquids affording inspiration for those who have not previously considered the application of ionic liquids in their area of interest.

Chapter summary

The chapter "Use of ionic liquids in solid-liquid separation processes" reports the possible use of ionic liquids (ILs) in solid-liquid separation processes by their immobilization in suitable solid supports. The economic benefits are highlighted, by using smaller amount of ILs in these processes and avoiding their loss in the aqueous phase. By immobilization of the ionic liquids on suitable solid support, the advantages of the ILs are combined with the properties of the

solid support, in this way enhancing the removal process of metal ions from aqueous solutions, especially when these metals are found in trace amounts. The chapter presents different types of solid supports used for immobilization of various ionic liquids. The methods used for the immobilization are also discussed. The adsorption efficiency of these ionic liquid immobilized solid supports in the removal process of different metal ions (Cr, Hg, Pt, Au, Pd, Cs, Sr, Tl, etc.) from aqueous solutions were presented. The inorganic materials present a higher efficiency to be used as solid supports for the immobilization of the ILs. It was observed that the physical method of impregnation, especially ultrasonication, has a positive effect on the adsorption capacities of the materials obtained.

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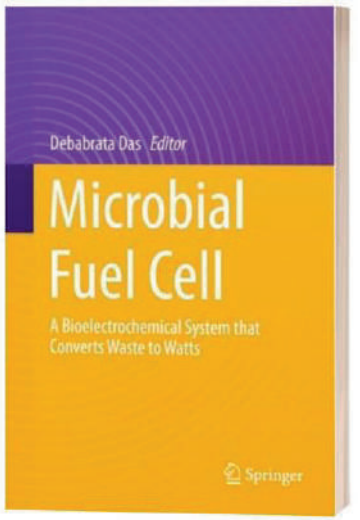
RECENT PROGRESS TOWARDS SCALING UP OF MFCS



(2018)

DIPAK A. JADHAV, MAKARAND M. GHANGREKAR, NARCIS DUȚEANU

BOOK CHAPTER PUBLISHED IN MICROBIAL FUEL CELL: A BIOELECTROCHEMICAL SYSTEM THAT CONVERTS WASTE TO WATTS

DEBABRATA DAS (ED.)

SPRINGER
ISBN 978-3-319-66793-5
DOI 10.1007/978-3-319-66793-5_23

Short description of the book

The book "Microbial fuel cell – a bioelectrical system that converts waste to watts" aims to highlight the importance of bioelectrical systems able to directly convert chemical energy into the electrical one. Greater importance of such devices is evidenced from the ability to use as energy source waste from residual water. Due to that, such systems ensure the wastewater remediation concomitantly with energy production. Microbial fuel cells represent electrochemical devices where higher organic molecules founded in wastewater are converted into smaller one, releasing electrons and protons, thereby generating electricity. Direct conversion of chemical energy into the electrical one inside of MFC is possible through bioelectrochemical reactions when microorganisms or enzymes are used as a catalytic system. The main advantage of MFCs is represented by the capacity to use a wide range of organic and inorganic substrates, soil sediments as chemical energy source. MFCs can achieve high conversion efficiency if direct or single step conversion of the substrate is used.

Chapter summary

Due to the concerns associated with environmental protection, it is important to recover all wasted energy. One important energy source can be represented by the organic matter presented into the wastewater. Microbial fuel cell (MFC) represents an advanced bioelectrochemical system used for treatment of wastewater which is able to transform chemical energy available in the organic matter present in wastewater directly into electrical energy. Such direct conversion of the organic matter into the electrical energy is possible by using as biocatalyst electrochemical active bacteria (EAB). In the anodic chamber, EAB fixed onto the anode surface converts biologically oxidizable organic matter into carbon dioxide, protons and electrons. Electrons (e^-) are collected by the anode material and further passed to the cathode through an electrical circuit. Protons (H^+) crossing from the anodic chamber into the cathodic one through a CEM by cation exchange capacity of membrane. In the cathodic chamber, the protons and electrons combine with oxygen to form water as an end product during the reduction reaction.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

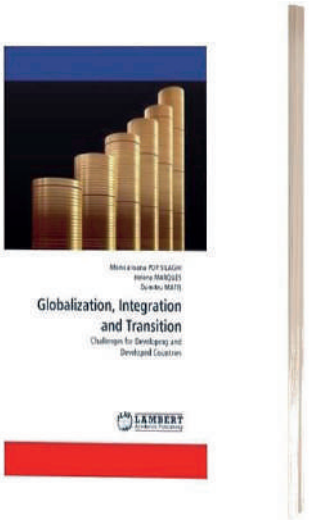
3

SOCIAL SCIENCES

3.1. ADMINISTRATIVE SCIENCES
3.1.1. PUBLIC ADMINISTRATION

85

ASSESSING ROMANIAN FINANCIAL SECTOR STABILITY: THE IMPORTANCE OF THE INTERNATIONAL ECONOMIC CLIMATE



(2010)

CLAUDIU ALBULESCU

BOOK CHAPTER PUBLISHED IN GLOBALIZATION, INTEGRATION AND TRANSITION: CHALLENGES FOR DEVELOPING AND DEVELOPED COUNTRIES

MONICA IOANA POP SILAGHI, HELENA MARQUES, DUMITRU MATI (EDS.)

LAMBERT ACADEMIC
ISBN-13: 978-3838311654

ISBN: 978-3-8383-1165-4

Short description of the book

Fourteen papers are published in the volume entitled "Globalization, Integration and Transition: Challenges for Developing and Developed Countries". The papers are developed considering two major axes, namely "Globalization, Integration and Development" and "Facing Globalisation, Integration and Transition: Emergent countries" with a focus upon the Romanian Economy. This collection of papers aims to stimulate the debates on the economic and financial integration of Central and Eastern European countries. The book will help to broaden the exchange of ideas among economists in both academia and business.

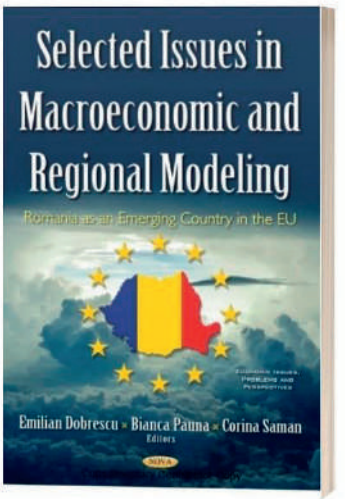
Chapter summary

The aim of the research conducted in this chapter is to develop an aggregate stability index for the Romanian financial system. The index, which is meant to enhance the set of analysis

used by the central bank to assess the financial stability, accurately reflects the financial stability dynamics and the periods with financial turbulences during 1997-2007 in Romania. By the application of a technique which enables the measurement of the components' contribution to the aggregate index volatility, we show that some individual stability indicators require a close monitoring by the authorities in order to detect the instability periods. As novelty we consider the role of international economic climate in influencing the systemic financial stability. The outcome of the study shows an improvement of the Romanian financial stability during the analysed period. The aggregate index volatility also decreased starting with 1999. The financial vulnerability and financial soundness indicators have a significant contribution to the volatility of the aggregate index in the periods foregoing the crisis appearance. More precisely, we show that the volatility of the world economic climate indicators is reduced before the crisis, rising immediately after its burst out.

86

FORECASTING THE GROWTH RATE, THE EXCHANGE RATE AND THE INFLATION RATE IN ROMANIA: A COMPARISON OF DIFFERENT FORECASTING MODELS



(2016)

CLAUDIU ALBULESCU, AVIRAL TIWARI

BOOK CHAPTER PUBLISHED IN SELECTED ISSUES IN MACROECONOMIC AND REGIONAL MODELING: ROMANIA AS AN EMERGING COUNTRY IN THE EU

EMILIAN DOBRESCU, BIANCA PAUNA, CORINA SAMAN (EDS.)

NOVA SCIENCE PUBLISHERS
ISBN-13: 978-1634849364

ISBN: 978-1-63484-966-1

Short description of the book

This volume brings together 18 studies dedicated to the anniversary of a quarter century since the foundation of the Macroeconomic Modelling Seminar of the Romanian Academy. The studies are devoted to research on macroeconomics and focus on issues raised by modelling and forecasting aggregate indicators as industrial production, GDP growth rate and price indexes. A special interest is manifested for the exchange rate forecasting, which represents a real challenge in the case of a small open economy as Romania. Further, understanding underlying trends of inflation and focusing on expectations and interactions among inflation, output growth and their uncertainties are important issues for emerging countries. The purpose of the book is therefore to shed light on recent forecasting techniques applied to macroeconomic indicators. The results of these studies serve as guidance for specialist involved in macro-level forecasting and for business makers.

Chapter summary

This chapter aims to assess the out-of-sample forecasting performance of six forecasting models (ARFIMA, ARIMA, Holt, ETS, Cubic Spline and Theta), with an application on Romanian macroeconomic time-series, namely the economic growth rate, the exchange rate and the inflation rate. The paper also draws a comparison between the forecasting results of the proposed models and the long- and medium-term prognoses of the National Forecasting Commission. The forecasting performance of each model is evaluated based on standard metrics and the results show that the accuracy performance is higher in the case of the ARIMA model. Our findings state that the official prognoses are closer to the real data than the results of the proposed models, for all the considered macroeconomic series. Furthermore, we show that the discrepancies between the ARIMA model and the official prognoses are higher for the medium-term estimation as compared with the long-run forecasts.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

3

SOCIAL SCIENCES

3.2. ECONOMICS
3.2.1. MANAGEMENT

87

COMPETITIVENESS STRATEGIES AND TACTICS FOR THE INTERNATIONAL SCIENTIFIC-ACADEMIC ASSOCIATIONS AND CLUSTERS

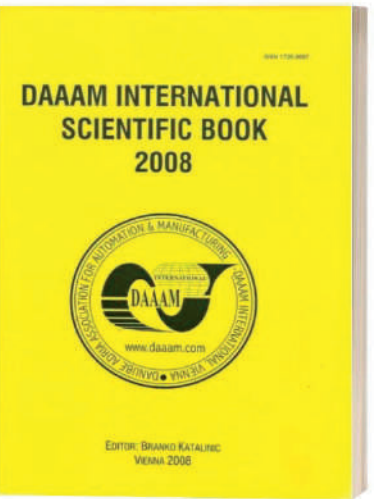
(2008)

HORIA POPA, MARIAN MOCAN,
MONICA IZVERCIANU, LIANA PATER

BOOK CHAPTER PUBLISHED IN DAAAM INTERNATIONAL SCIENTIFIC BOOK

KATALINIC B. (EDS.)

DAAAM International, Vienna, Austria
ISBN 978-3-901509-66-7
DOI 10.2507/daaam.scibook.2008.52



Short description of the book

The purpose of Danube Adria Association for Automation & Manufacturing International (DAAAM International) is to provide a world forum for engineers, scientists and industrial managers to present and discuss the current status and impact of advanced manufacturing and automation. During the last twenty years, the activities of DAAAM International have been supported by scientists and experts from over fifty countries all over the world. The DAAAM International publishing activities was started in 2002 new periodical edition known as DAAAM International Scientific Book. This is the open series for the publishing of the most recent research results and international projects from all technical fields and scientific disciplines which are in the field of interest of DAAAM International.

Chapter summary

The cooperation among International Academic and Research & Development Associations {IARDA} and among clusters requires the development and implementation of a new innovative and integrative management of the competitiveness. For the {IARDA} and clusters, the specific ways and programs for competitiveness increase have not been yet rigorously studied. We define the new concept „integrative sustainable competitiveness Kid". We analyse the competitiveness of International Academic and Research & Development Associations {IARDA} in the globalised coopetition of the 21st century. We develop a unitary methodology for the competitiveness strategy and tactics of IARDA and clusters that include International Academic and Research & Development Associations.

The 52th chapter, "Competitiveness Strategies and Tactics for the International Scientific - Academic Associations and Clusters" presents in detail the following original contributions:

- The sustainable competitiveness of IARDA organisations and inoclusters definition
- Unitary methodology in the prospective, strategic and tactic management of the IARDA and inoclusters competitiveness

The management and engineering integrated process meets four periods (Where are we? Where should we arrive? How do we get there? Did we get where we wanted to?) and develops on 12 stages:
1) The object definition (OMK_s) and the formulation way of the sustainable competitiveness plan; 2) The competitiveness profile of the OMK_s (multidimensional identification: absolutely, relatively, profile, market value, sustainability etc.); 3) The competitiveness analysis of the OMK_s, the result being the sustainable competitiveness diagnosis; 4) The market and external/ internal environments survey and the marketing/ sustainability opportunities analysis for the OMK_s; 5) The formulation/ actualisation of the prospective/ strategically actions directions (DAS) for the OMK_s sustainable competitiveness development in target markets/ segments/ niches/ crenels and all extern environments; 6) The vision, aim, mission and objectives $\{y_p\}$ definition on prospective (> 20 years), long (> 2 years) and medium term (1...2 years) for OMK_s; 7) The $\{V_j\}$ strategically competitive alternatives elaboration for the OMK_s in a detailed and correlated manner (time horizon, hierarchical levels etc.); 8) The strategically alternatives $\{V_j\}$ analysis with portfolio, benchmarking, risk, efficiency, etc. methods and the optimal strategies selection $\{V_{opt}\}$ for OMK_s; 9) Formal deepening of optimal strategies (elaboration of necessary projects) for the OMK_s; 10) The competitive strategies application in an inter-correlated manner and the mobilisation and development of all resources around the optimal strategies for OMK_s; 11) The optimal strategies application monitoring for the OMK_s at all hierarchical levels; 12) The continuous strategically control and the sustainable competitiveness control for the OMK_s and its external environments realised at all levels of the prospective/ strategically/ tactical planning, organisation, processing, and decision.

The systematic increase of the {IARDA} and clusters' competitiveness require the enlargement of multidimensional networks in public - private partnership, including {IARDA}, capable to develop the "critical-mass" necessary for the rise of integrative sustainable competitiveness in clusters, sectors, regions, continents and the Earth.

88

CLUSTERING AND CLUSTERS. A SYSTEMIC APPROACH

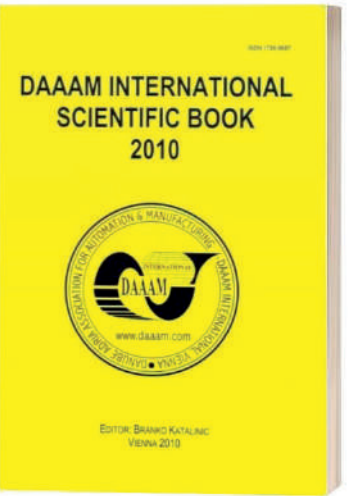
(2010)

HORIA POPA, MARIAN MOCAN, MONICA IZVERCIANU, LIANA PATER

BOOK CHAPTER PUBLISHED IN DAAAM INTERNATIONAL SCIENTIFIC BOOK

KATALINIC B. (EDS.)

DAAAM International, Vienna, Austria
ISBN 978-3-901509-74-2
DOI 10.2507/daaam.scibook.2010.19



Short description of the book

The purpose of Danube Adria Association for Automation & Manufacturing International (DAAAM International) is to provide a world forum for engineers, scientists and industrial managers to present and discuss the current status and impact of advanced manufacturing and automation. During the last twenty years, the activities of DAAAM International have been supported by scientists and experts from over fifty countries all over the world. The DAAAM International publishing activities was started in 2002 new periodical edition known as DAAAM International Scientific Book. This is the open series for the publishing of the most recent research results and international projects from all technical fields and scientific disciplines which are in the field of interest of DAAAM International.

Chapter summary

The modern science progresses when a more general theory is formulated, which explains as many phenomena as possible with as few statements as possible. This idea, that more general theories are preferred over more specialized theories, lies at the heart of system science. The clustering systemic approach explains a great number of phenomena related to the becoming/ change in the most diversified domains using a small number of concepts and models. The 19th chapter "Clustering and clusters. A systemic approach" presents in detail the new research and action sub-domain defined as "cluster-based sustainable integrative competitiveness (on unlimited term in space – time – resources – processes – products)", by the following original contributions:

- Integrative definition of the main concepts of systemics,
- Functional-structural definition and characterization of clusters, clustering an inoclusters, which allows the systemic approach and the unitary application of these concepts, in most various domains of reality [science (physics, astrophysics, chemistry, biology, health science etc.), computing, economics, engineering, management, policies, politics etc.],
- Stressing the fundamental role of the clustering and clusters in the systems change (progress/ stagnation/ regress) in Universe/ Multiverse,
- Elaboration of a model for the universal cycle of a system becoming/ change, which emphasizes the essence of progress in any domain of reality: integrative innovation and inoclusters-based sustainable competitiveness,
- Systemic analysis of clustering within business and innovation environments, of the progress ways in this domain.

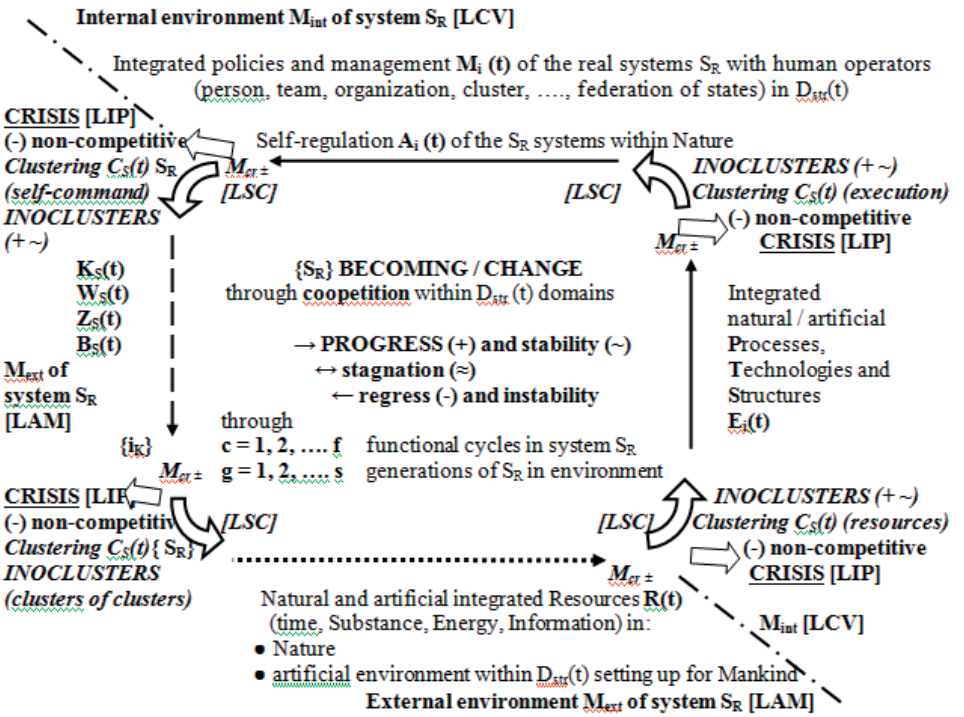


Fig.1. Principal model for the causal cycle of becoming / changing of real systems {S_R} in the space-time-resources domains $D_{str}(t)$ of the Universe / Multiverse (?)

89

THE ROLE OF THE EDUCATIONAL SYSTEM TO THE ENTREPRENEURIAL DYNAMICS AN TERNATIONAL COMPARATIVE PERSPECTIVE

(2013)

MATEI TĂMĂȘILĂ

BOOK CHAPTER PUBLISHED IN POST-DOCTORAL STUDIES IN ECONOMY

P.I.OTIMAN, C.IONESCU, E.DINGA (EDS.)

EDITURA ACADEMIEI ROMÂNE
ISBN-978-973-27-2290-9

Short description of the book

One hundred thirty-four studies are published in the collection entitled "Post –doctoral studies in economy". The papers are developed considering six major axes: State size and the economic efficiency, Financial and monetary issues, Fiscal-budgetary issues, The impact of research and innovation for the economic progress, The impact of globalization for the structure and dynamics of the economic systems, Conceptual and methodological approaches to economic processes. This collection of researches aims to stimulate the debates on the economic, financial, entrepreneurial and innovative integration of Central and Eastern European countries. The book will help to broaden the exchange of ideas among interested people in both academia and business.

Chapter summary

The aim of the research conducted in this chapter is to reveal the influence of the educational process on the intention to have an entrepreneurial behaviour, from the perspective of the individual perception on the educational offer as well as on the entrepreneurship. The main aspects presented are: the conceptual delimitation of the entrepreneurial phenomenon, in order to draw as much as possible the limits of the current entrepreneurial thinking and the perspectives of the future researches; synthesize the process approaches of the entrepreneurial phenomenon to highlight the multitude of factors of influence and to establish criteria for their grouping and evaluation in order to select and present those models capable of forming the integral, integrating and relevant starting point of the following research be undertaken; defining the educational process for: determining the potential targets and analysing the educational offer in an entrepreneurial context as well as determining its innovative level ; and finally we made a comparative study of entrepreneurial intent as a predictor of entrepreneurial behaviour, starting from individual perception as a mediator, to identify potential levers of action from this perspective.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

4

HUMANITIES AND ARTS

4.1. PHILOLOGY

4.1.1. APPLIED MODERN LANGUAGES

90

ÉCRIRE POUR SON LECTEUR-LA PRATIQUE DE L'EXPRESSION ECRITE

(2010)

MARION-IVONNE COHEN-VIDA

Éditions universitaires européennes
ISBN 978 613-1-55602-9

Short description of the book

Writing in a foreign language (French in this case) is a difficult task, as you might be not only in the situation to tell a story, but also to express your point of view, to justify a decision or to make someone change his/her opinion. Briefly we write for our reader in order to convince him/her. The purpose of this book is to summarize in the simplest and clearest way the processes most frequently used to write a good plan, to summarize a text, or to write consistent paragraphs or convincing essays, etc. It seeks to do more than to expose knowledge or theories because it has a practical purpose. By the analyzes carried out, by the practical pieces if advice, it offers the possibility of a training with the techniques of expression, that is with all that makes it possible to write with order and efficiency.

The book is intended primarily for two categories of users: (1) college and faculty students who study written expression techniques. They will find an accessible theoretical basis for their work of analysis and production of written texts and a big number of exercises for each theoretical problem discussed; (2) all those who are keen to develop their ability to write (even if they have abandoned any study for a long time). They can practice taking this book as a guide.

Book summary

This book is a second edition of two previous books of written expression, published this time in a new vision, where the theoretical part of each chapter is followed by the practical exercises. In this way the use of the book becomes easier and the progresses more evident.

Some of the theoretical parts have been reviewed from the first edition and some of the practical exercises have been updated.
The book has nine chapters: The plan and the intention to inform and persuade; The conclusion and the introduction; Titles and intertitles; The summary of texts; The synthesis of texts; The paragraph; The essay; Types and genres of texts; Personal correspondence.

Each chapter has two parts a theoretical one where the information is presented in a very accessible way and a practical one where the examples are taken from authentic documents. This desire to keep the book in contact with the reality is accompanied by another one: to use only texts of very good quality. It is only by reading texts belonging to people who think well and express themselves well that students learn to express themselves.

When working at this book we had in mind two main ideas: (1) the progress in written expression is the result of a continuous effort of enriching the linguistic knowledge and the logical thinking; (2) the abilities of written expression can be improved only by intensive study and perseverant practice.

The book aims to teach the users to write better, but also to read better, as we consider that if someone learns to use the techniques of written expression, he/she will recognize them in a text and will be able to make a careful lecture.

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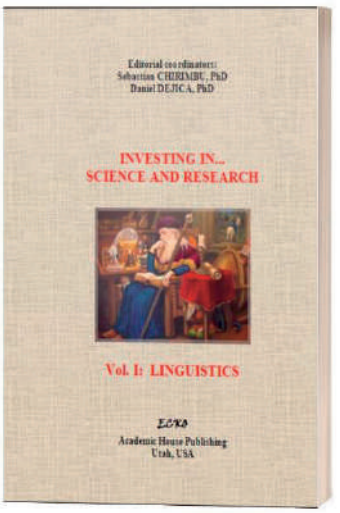
INVESTING IN... SCIENCE AND RESEARCH. VOL. I. LINGUISTICS, ESP, CULTURAL STUDIES

(2013)

DANIEL DEJICA, SEBASTIAN CHIRIMBU (EDS.)

ECKO ACADEMIC PUBLISHING, USA
ISBN 978-1-4276-5408-3



Short description of the book

The book series *Investing in… Science and Research* was initiated by the *Centre of Research, Resources and European Studies* and the *European Association for Promoting Excellence in Education and Research*, Bucharest, Romania, in a joint effort to share the results of the scientific research undergone by their members within the research project *Promoting the Society of Knowledge through Education and Interdisciplinary Research* (RO/2013/ PSKEIR-02), and to contribute to the existing interdisciplinary research in the field.

The articles have been grouped into five thematic volumes, as follows: *Linguistics, ESP, Cultural Studies; / Literature, Communication, Cultural Studies/ Education and Interdisciplinary Studies, / Economics, Law and Politics.*

The present volume *Linguistics, ESP, Cultural Studies*, is a collected volume, which, in addition to the research articles mentioned above, contains selected papers from the contributions delivered at the conference *Past, Present and Future. Interdisciplinary Research - a Key to the European Cultural Space (PPFIR2012*), held in Bucharest on November 8-10, 2012.

Book summary

As its name implies, the volume is divided into three main sections: Linguistics, ESP, and Cultural Studies. Section I allots space to various approaches to linguistics and shows us that research in translation, syntax or language in use can be used to teach us more about the linguistic realities which surround us. Section II gathers articles on English for Specific Purposes. It discusses the challenges and the future of higher education, and places emphasis

on the way technology has shaped and influenced teaching in a globalized world. Section III includes contributions on culture and reinforces the fact that cultural knowledge is essential when approaching different texts and contexts.

In addition to its contribution to the existing research in the fields of linguistics, ESP and cultural studies, the volume is also meant to be a source of inspiration for younger researchers and students.

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INTERKULTURELLER-DAF-UNTERRICHT IN RUMÄNIEN

(2015)

ANDREEA RODICA RUTHNER

Verlag DR. Kovač
ISBN 978-3-8300-8425-9

Short description of the book

Being a member of the European Union, Romania is part of an international context, where cross-cultural relations are increasingly promoted and maintained, as our society must be prepared to get in touch with different foreign cultures. Teaching foreign languages, underlining the importance of cross-cultural communication may be a first step in this respect.

As part of a globalized capitalism and an increasing development of international mobility, we get in touch with members of foreign cultures and must face critical incidents and circumstances in which we require appropriate cross-cultural skills.

By teaching elements of cross-cultural communication during the classes of foreign languages, we can reduce a potential conflict caused by cultural differences, and those who learn a foreign language might also acquire cross-cultural skills. Thus, Romania would benefit from a moral and a material point of view, both economically and culturally. At the same time, some social tensions could be avoided.

Furthermore, the main beneficiaries might be the pupils and students, who are granted a large number of scholarships in the German speaking countries. Within a foreign environment they encounter cross-cultural communication gaps and they have to manage these situations.

Multiculturalism is also present in Romania, more than twenty national minorities live together in our country being recognized by the Romanian Government and protected by the Constitution. In Banat we can even speak about interculturalism, as for centuries this region has been an example of a successful coexistence of different cultures within the same society. Thus, the inhabitants of Banat have created their own intercultural identity.

Book summary

The starting point of this paper is a research on the aspects of intercultural learning.

Chapter two provides an introduction to the topic of intercultural didactics of foreign languages. It analyzes not only the etymology and the meaning of the term, but also the importance of this phenomenon within the present European context.

Chapter three focuses on the objectives of teaching and learning a foreign language.

Chapter four presents methodological approaches used to develop cross-cultural skills during the language classes.

In the fifth chapter the focus is on the relations with minorities in Romania.

The following chapter directs the reader to the intercultural, multiethnic education in Romania. The focus is, in particular, on the situation of Banat: this chapter showing aspects of the development of cross-cultural education in Banat, the influence of bilingualism on acquiring a foreign language, cross-cultural communication and education in Timisoara in the 21st century.

Chapter seven deals with the context of teaching German as a foreign language in Romania, cross-cultural approach of didactics of foreign languages in Germany, in the second half of the last century.

The final chapter provides an analytical perspective on intercultural issues in teaching German as a foreign language in Romania. Starting from a research based on a survey among secondary, high school and university teachers on the one hand, and pupils and students on the other hand, we have analyzed the circumstances favourable to acquiring cross-cultural skills during the German language classes.

The last part of this paper contains contains conclusions about the most difficult issues of teaching cross-cultural skills during the German classes in Romania. We have provided some recommendations to improve the existing means of teaching.

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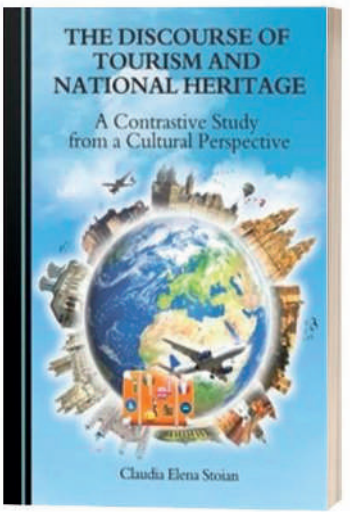
THE DISCOURSE OF TOURISM AND NATIONAL HERITAGE: A CONTRASTIVE STUDY FROM A CULTURAL PERSPECTIVE

(2015)

CLAUDIA ELENA STOIAN

Cambridge Scholars Publishing
ISBN 978-1-4438-8219-4



Short description of the book

The Discourse of Tourism and National Heritage: A Contrastive Study from a Cultural Perspective depicts an in-depth research study in the field of online tourism promotion. It analyses the national online promotion of UNESCO World Heritage Sites, looking at institutional and commercial types of websites belonging to three countries, namely Romania, Spain and Great Britain.

The book focuses on the way in which each country presents its national World Heritage landmarks and combines different modes to compose a virtual brochure with a promotional message. Particularly, it analyses the institutional and commercial websites, regarding their organization, the webpages included, the lexico-grammatical characteristics of their promotional messages, as well as their visual ones. The analysis, carried within the theoretical framework provided by Systemic Functional Linguistics, looks at the ideational, interpersonal and textual meanings of both the verbal and visual messages.

The findings of the study are compared in relation to the types of websites and to the countries to which they belong. These are further interpreted from a cultural perspective, showing that they can be accounted for by cultural variability, in particular the dimension of context. The results highlight the importance of multimodality and interculturality in online tourism promotion.

The book can be a useful resource for students, teachers, researchers, web designers, copywriters and promoters belonging to the fields of applied linguistics, tourism, advertising and/or intercultural communication.

Book summary

The book is divided in four parts. The first part is introductory and presents the book, its motivation, a relevant literature review and the research questions raised by the study.

The second part contains four chapters (Chapter two – Chapter five), which set the theoretical framework of the study. Chapter two is dedicated to the field of tourism and focuses on cultural tourism, destination branding and the Internet. Chapter three depicts the particularities of promotional tourism discourse in relation with language and image. Chapter four and five present the theoretical frameworks, the former refers to the multimodal analysis of the websites, while the latter to their cultural analysis.

The third part depicts the study in four chapters (Chapter six – Chapter nine). Chapter six describes the methodology, design and corpus of the study, and the method of analysis of the linguistic and visual components. Chapter seven and eight provide and discuss the results, focusing first on the institutional set of websites and then on the commercial set. Chapter nine presents a comparison of the findings from two perspectives. The first refers to the type of websites, either institutional or commercial, and the second, to the country, i.e. Romania, Spain or Great Britain. The findings are then interpreted from the cultural perspective of the dimension of context.

The conclusions of the study are presented in the final part of the book, Chapter ten. The main results are summarized and their practical implications for the field of online tourism are emphasized.

The book contains also an Appendix with the linguistic and visual analyses carried on the websites chosen.

94 LANGUAGE AND COMMUNICATION IN THE DIGITAL ERA. CHALLENGES AND PERSPECTIVES

(2016)

DANIEL DEJICA, GYDE HANSEN, PETER SANDRINI, IULIA PARA (EDS.)

Warsaw/Berlin: DeGruyter Open
ISBN: 978-3-11-047204-2
e-ISBN: 978-3-11-047205-9
DOI: 10.1515 / 9783110472059

Short description of the book

Edited by Daniel Dejica (Politehnica University of Timişoara), Gyde Hansen (Copenhagen Business School), Peter Sandrini (University of Innsbruck) and Iulia Para (University of the West, Timişoara) and published by De Gruyter, this collected volume pinpoints the impact of new technologies on languages and communication, highlights the evolution and changes undergone by humanities in conjunction with technological innovation, and looks at the way the language industry has adapted itself to the challenges of today's digitized world.

The need for cooperation in such areas as industry, transportations, communications, or entertainment, the ever-growing increase in international trade, the enlargement and proliferation of international institutions, the need to keep up with the latest advances in all branches of science and technology, the linguistic consequences of the EU enlargement and the Digital Agenda for Europe are only some of the situations which account for the need to investigate the evolution of language in a globally digitized world. To address the needs of research in this ever-growing and ever-changing context, the editors brought together the contributions of several humanities scholars from Romania and abroad, who focus on the evolution of language in the digital era. The eighteen contributions are divided into three thematic parts, which explore general aspects of humanities and linguistics in the digital environment, the evolution of language and translation in today's digitized society, and the changes, challenges and perspectives of language teaching and learning in the age of technology.

Book summary

The Introduction of the book is signed by the editors; it includes a rationale, a description of the book (a summary based on the abstracts provided by each contributor) and a section of notes on contributors.

Part 1, *Humanities Gone Digital*, includes four chapters and explores general aspects of humanities and linguistics in the digital environment.

Part 2, *Language and Translation: From Pen and Paper to the Electronic Environment*, consists of eight contributions, which focus on a more specific branch of Philology, namely translation. The topics discussed include, but are not limited to the impact of new technologies on specialised translation, online resources for terminology management, translation of online advertising, subtitling, etc.

Part 3, *Language Teaching and Learning in the Age of Technology*, includes six chapters on language teaching and learning and will addresses the changes, challenges and perspectives of didactics in the age of technology.

Each contribution is divided into several sections that present the state of the art and the methodology used, and discuss the results and perspectives of the authors. The book is recommended to scholars, professionals, students and anyone interested in the changes within the humanities in conjunction with technological innovation or in the ways language is adapting to the challenges of today's digitized world.

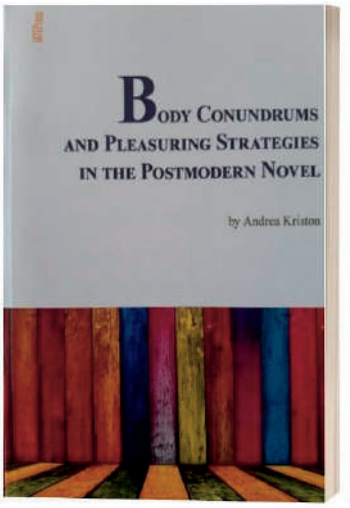
95

BODY CONUNDRUMS AND PLEASURING STARTEGIES IN THE POSTMODERN NOVEL

(2016)

ANDREA KRISTON

Jate Press Szeged
ISBN 978-963-315-289-8



Short description of the book

As the title indicates, this study analyses the problems of body and sexuality from a postmodern perspective. The body is the primary referent in visually grounded categorisations of people. Much mainstream and commonsense thinking assumes that the body is the most obvious sign of a person's gender. Sexuality is connected with sex, implicitly pleasure. The body is the foundation of all sexuality; more precisely we need a sexed body capable to give pleasure. Sexuality and varieties of expressing it are connected to physiology and anatomy and the differently sexed bodies of female and male. Postmodernism and what it amounts to is not yet very clear. Does postmodernism represent something after modernism or something going against it? Seen in terms of economic and social development, postmodernism has welcomed gender differences for the first time, and has worked for the abolition of women's passive role.

This study deals with four novels that treat aspects of sexuality, as well as of the body, from several angles, and address researchers, students or anyone interested in gender studies. The novels are: *Written on the Body* by Jeanette Winterson, *The Buddha of Suburbia* by Hanif Kureishi, *Queer* by William S. Burroughs and *Hallucinating Foucault* by Patricia Duncker. They were published in the second half of the 20th century and specifically between 1990 and 1996 (except *Queer).* There are as many similarities as there are dissimilarities between the four volumes; many discrepancies reinforce the same issue from a variety of perspectives. My approach to the body and sexuality is neither philosophical nor scientific; it is a literary interpretation of the above mentioned aspects seasoned with feminist and psychoanalytic perspectives.

Book summary

This book aims to cover standard and new electric machines in a comprehensive manner.

The book comprises four main chapters, each novel being discussed in a chapter. The first one treats topics of body and sexuality from the perspective of Winterson's novel. The central body of the novel belongs to an ungendered narrator; it is sexed, but the lack of gender places it in a whirl that challenges compulsory heterosexuality. Winterson plays with her readers, urging them to imagine a world where desire no longer has gender-imposed boundaries. Conceived as a literary *tour de force*, Winterson's deliberate gender omission is part of a literary experiment of playing with the text.

Chapter 2 focuses more on sexual aspects, although Hanif Kureishi pampers his audience with body aspects as well, presenting an agreeable Indo-British teenager caught between belonging and not. He fluctuates in his sexual and ethnic identification, and we can 'label' him as bisexual.

In Chapter 3, queer theory involves not just sexual aspects but political ones as well. Burroughs' ambition was to write a queer novel by focusing on a male-to-male approach, complemented by elements drawn from the experience of serious addiction to drugs and alcohol. The queer universe is set in Mexico, a proper location for any sexual or other type of experiments.

Finally, chapter 4 takes the reader down to forbidden and dark areas of the mind, in *Hallucinating Foucault*. The sexual orientation studied is again homosexuality, combined with the dark mind of a novelist who experiences the dialogue of the absurd. Each novel concentrates upon a sexual behavior or trend, but the book combines body and sexual aspects with contemporary society, often crippled and oppressive which is beginning to open its eyes to traditional roles.

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FOSTERING TRANSCULTURAL COMMUNICATION: THE ROLE OF CULTURE-BOUND WORDS IN THE TRANSLATION OF ONLINE TOURIST TEXTS

(2018)

DANIEL DEJICA, CLAUDIA STOIAN

BOOK CHAPTER PUBLISHED IN TRANSCULTURAL COMMUNICATION IN MULTILINGUAL DIALOGUE

VLASTA KUČIŠ (ED.)

VERLAG DR. KOVAC
ISBN-10: 3830098375
ISBN-13: 978-3830098379

Short description of the book

The book includes topics in general translation studies, transcultural and multilingual communication and interpreting. The anthology reflects the full range of theoretical and practical aspects of translation and interpreting, which cover key areas relevant to multilingual dialogue and transcultural communication: translator training, translation literacy development, technical translation, transcultural dialogue, particularly important for the new EU Member States, aspects of the highly complex translation of historical and legal sources, translating for the market, translating and interpreting in the EU Parliament, literary translation as well as challenges of dialect translation. The authors demonstrate the extraordinary richness of approaches and the incredible dynamics of modern trans-cultural communication. The publisher is certain that this publication is a descriptive, comprehensive and trend-setting contribution to the transcultural European dialogue.

Chapter summary

The *European Capital of Culture* initiative, as detailed on the *Creative Europe* platform, is designed to highlight the richness and diversity of cultures in Europe, to celebrate the cultural features Europeans share, to increase European citizens' sense of belonging to a common

cultural area and to foster the contribution of culture to the development of cities. The aim of this research is twofold: to analyse from a cultural and translational perspective the websites of the tourist information centres in four Romanian cities short-listed for the title of European capital of culture, and to identify the way in which they are currently prepared to facilitate and promote transcultural communication in a multilingual environment. Based on the research findings, a series of recommendations are formulated, aimed at supporting the desiderata of the underlying concept of *European Capital of Culture*.

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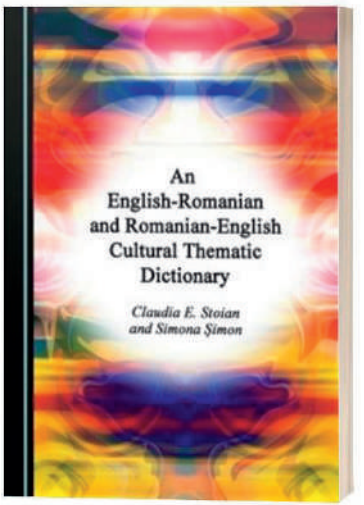
AN ENGLISH-ROMANIAN AND ROMANIAN-ENGLISH CULTURAL THEMATIC DICTIONARY

(2018)

CLAUDIA E. STOIAN & SIMONA ŞIMON

Cambridge Scholars Publishing
ISBN 978-1-5275-1136-1



Short description of the book

An English-Romanian and Romanian-English Cultural Thematic Dictionary focuses on the cultural aspects of today's multicultural society, from a linguistic perspective. Organized thematically and alphabetically, its vocabulary is general and semi-specialized and deals with topics such as cultural ideology, national identity, cuisine, clothing, holidays, language and sports. It mainly establishes the appropriate equivalence between the pairs of languages chosen, approaching the topics linguistically.

The aim of this bilingual dictionary is to assist people communicating in multicultural and multilingual environments so that they manage to have successful intercultural exchanges. The mastering of the cultural norms and the culture-specific vocabulary of the languages spoken is a must in the context of present-day globalized and multicultural society, which encourages traveling to foreign countries for leisure or work.

An English-Romanian and Romanian-English Cultural Thematic Dictionary has as a target audience translators, interpreters, students, and other professionals working in the field of culture or one of the specified cultural sub-fields. It also addresses speakers of English and Romanian involved in any type of intercultural communication.

Book summary

An English-Romanian and Romanian-English Cultural Thematic Dictionary has two main parts, one dedicated to English as a source language, and the other to Romanian. Both parts include a list of abbreviations and symbols, several vocabulary sections and some thematic lists. The keywords selected, usually used in the United Kingdom, are organized alphabetically.

Moreover, they provide additional information, such as contextual instances, grammatical category and irregular plural of English nouns.

The first vocabulary section focuses on the topics of cultural ideology and national identity and contains keywords used in defining and understanding culture and intercultural communication. The main aspects covered are language, religious, political and social organization, daily patterns in society and cultural trends. The second section introduces vocabulary from the lexical fields of cuisine, clothing, holidays and sports. The last vocabulary section provides a list of frequent verbs used in the field of culture.

Finally, the dictionary presents five thematic lists of frequently used interjections and onomatopoeia, measurement units, continents and population, and countries, nationalities, languages and currencies.

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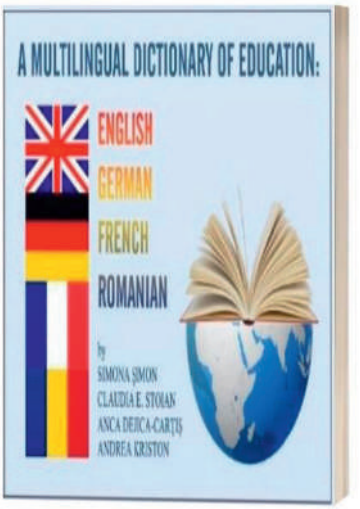
A MULTILINGUAL DICTIONARY OF EDUCATION: ENGLISH-GERMAN-FRENCH-ROMANIAN

(2018)

SIMONA ŞIMON, CLAUDIA E. STOIAN,
ANCA DEJICA-CARȚIȘ, ANDREA KRISTON

JATEPress
ISBN 978 963 315 375 8



Short description of the book

The role of education in society has changed over time as it became more accessible due to the technological development, the globalization and internationalization process that have reshaped the entire educational system. For example, nowadays people can get an education in real and virtual learning environments. The latter ones make it possible for all human beings that have an Internet connection to gain an international learning, teaching or training experience if they master a common language with the providers of education. Moreover, the educational goals are shared and promoted by educational institutions all over the globe by recourse to various means, among which one can mention the rendering of the message into at least a foreign language. In this context, knowing the educational terminology in several international languages has become a must for all those who want to have an international educational experience or to promote educational programs on a global scale. Thus, *A Multilingual Dictionary of Education: English-German-French-Romanian* is useful for students, teaching or administrative staff, translators and interpreters, working in the field of education and its related subfields.

Book summary

A Multilingual Dictionary of Education: English–German–French–Romanian includes terminology selected from the field of education and the related subfields, for example critical pedagogy, curriculum and instruction, educational leadership, educational psychology, educational technology, and distance education. The around 2000 educational terms and expressions were translated into English by Simona Şimon and Claudia E. Stoian, into German by Anca Dejica-Carțiș, and into French by Andrea Kriston.

A Multilingual Dictionary of Education: English–German–French–Romanian has two parts. The first one contains a list of English key terms and expressions, organized alphabetically and equated into German, French and Romanian. The second one comprises the alphabetical index of the English, German, French, and Romanian key terms. The bibliography and webography highlights the sources used to select the corpus and to translate it into the chosen languages.

The present book, *A Multilingual Dictionary of Education: English–German–French–Romanian*, deals with educational terms and expressions from a multilingual perspective being a handy tool for everyone involved in the educational field and its related subfields.

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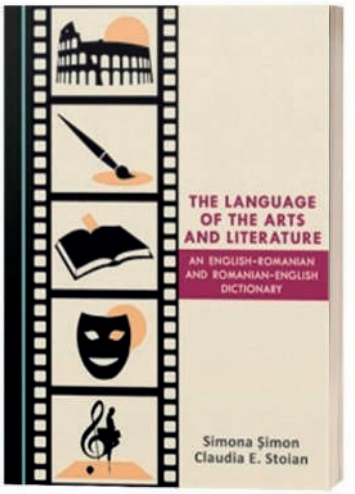
THE LANGUAGE OF THE ARTS AND LITERATURE: AN ENGLISH-ROMANIAN AND ROMANIAN-ENGLISH DICTIONARY

(2018)

SIMONA ŞIMON AND CLAUDIA E. STOIAN

Cambridge Scholars Publishing
ISBN (10): 1-5275-1368-8
ISBN (13): 978-1-5275-1368-6



Short description of the book

Language is one of the most important communication tools. Knowing the languages spoken by certain peoples helps us to discover and appreciate their national identity and culture. Among the things that shape our national identity and contribute to our global cultural heritage are the arts and literature. Considering this, *The Language of the Arts and Literature: An English–Romanian and Romanian–English Dictionary* aims to bridge the gap between two cultures, namely the English and the Romanian one, by facilitating communication in the fields of literature, visual and performing arts. The book comprises general and semi-specialized vocabulary that cover the following lexical fields: visual arts: architecture, sculpture, crafts, graphics, engraving, painting, photography, cinematography; performing arts: music, dance, theatre; literature.
It also includes information about the contextual use and grammatical features of the selected keywords in the source language and their equivalents in the target language. As in most of the dictionaries, the keywords are organized alphabetically.

The dictionary is of interest to students, translators, interpreters, and other professionals, that work in the field of culture in general, and of the arts and literature in particular.

Book summary

The Language of the Arts and Literature: An English–Romanian and Romanian–English Dictionary has three main parts: Part I: English–Romanian Dictionary; Part II: Thematic Sheets / Pagini tematice; Part III: Dicționar român–englez.

Both Part I and Part III contain a list of the abbreviations and a list of the symbols used in that particular part, a selection of field-specific English keywords in the first part and of Romanian ones in the third part. The keywords are translated into Romanian and English, respectively, providing details about their contextual use and some relevant grammatical features. The English keywords are particularly used in the United Kingdom, and observe the British spelling. Part II includes the following relevant to the topic bilingual thematic sheets: Important Periods in the Arts and Literature / Perioade importante în arte și literatură; Colour Wheel / Roata culorilor; Geometrical Shapes / Forme geometrice; Musical Notes on Staff / Note muzicale pe portativ; Seasons and Months / Anotimpuri și luni; Days of the Week / Zilele săptămânii; Reading Time / Citirea ceasului; Prepositions / Prepoziții.

The bibliographical list at the end of the dictionary highlights the most significant resources consulted for the completion of the present dictionary.

SCIENTIFIC
BOOKS
IN HIGHLIGHT

4

HUMANITIES AND ARTS

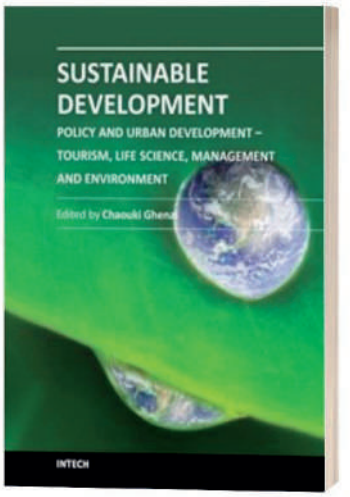
4.2. ARCHITECTURE

100

SUSTAINABLE URBAN DEVELOPMENT THROUGH THE EMPOWERING OF LOCAL COMMUNITIES

(2012)

RADU RADOSLAV, MARIUS STELIAN GĂMAN, TUDOR MORAR, ŞTEFANA BĂDESCU AND ANA-MARIA BRANEA



BOOK CHAPTER PUBLISHED IN SUSTAINABLE DEVELOPMENT - POLICY AND URBAN DEVELOPMENT - TOURISM, LIFE SCIENCE, MANAGEMENT AND ENVIRONMENT

CHAOUKI GHENAI (ED.)

InTech
ISBN : 978-953-51-0100-0

Short description of the book

The technological advancement of our civilization has created a consumer society expanding faster than the planet's resources allow, with our resource and energy needs rising exponentially in the past century. Securing the future of the human race will require an improved understanding of the environment as well as of technological solutions, mindsets and behaviours in line with modes of development that the ecosphere of our planet can support. Sustainable development offers an approach that would be practical to fuse with the managerial strategies and assessment tools for policy and decision makers at the regional planning level.

The book is addressing the main issue of the past decades for developed and developing countries, namely unsustainable urban development. Its chapters tackle a wide array of subjects, from heritage conservation, biodiversity, sustainable tourism development, social and economic sustainability to urban design and the environment as a factor of spatial injustice. All three pillars of sustainability are addressed in equal measure on a variety of types of interventions, scales and locations. The book is aimed for both policy makers and urban planners, landscape architects, public administrators and private urban developers.

Chapter summary

As a way-out strategy of the current financial, economic and social crisis, the Research Group for Sustainable Development Timisoara proposes an increase in governance efficiency through introducing new levels to the existing European, national, regional and local branches of administration, thus lowering the level of decision making. Strengthening the citizens ability to take initiative, make decisions, regarding crucial aspects (land use, street and park maintenance, community police, schooling, community services, use of funds from rates and taxes from their area), and implement them is the first step in ensuring the sustainable development of a territory regardless of its size, thus harmonizing the economical, ecological and social development.

The proposed type of urban analysis on a UTR spatial unit is important because only with the consent of the inhabitants can urban regulation be established, which imply tax imposition and control on land use which in turn lead to densification, increased proximity to the work space, green areas, increase use of bicycles at about 40% of total travels, development of small local businesses, etc. Otherwise a break in the connection between administration and citizens occurs and a raise in social exclusion and pollution, phenomena which are taking place on a high level of intensity in all European cities and especially Romanian ones.

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