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Book Reviews

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BOOK REVIEWS

Zenon J. Pudlowski: COMPUTERS IN ELECTRICAL ENGINEERING EDUCA-TION RESEARCH, DEVELOPMENT AND APPLICATION. Monash Engineering Education Series, Monash University, Clayton, VIC 3168, Melbourne 1995, ISBN 0-7326-0540-6.

The reviewed book was published by an Australian university, and was supported by UNESCO. Its aim is computer supported education in the discipline called Network Theory. This topic is successfully covered in 10 chapters.

In Chapter 1 the activities of members and associates of the EEERG (Electrical Engineering Education Research Group) are listed. Chapter 2 covers the important issues of computer-based programs. In the following chapters it is described how the design and implementation of these programs were carried out. Chapter 3 describes the widely and successfully used *Aptitude Test for Electrical Engineering.*

In the next two chapters research projects are presented concerning computer-based authoring systems. These projects led to the degree of Master of Engineering completed in 1993.

In Chapter 6 the ways of application of computers to electrical machines are discussed. First of all, the induction motor controlled by a personal computer is explained. This work led to the Bachelor Degree in Engineering. Chapter 7 presents an extension of the work presented in Chapter 6. The set of laboratory procedures is introduced here for the undergraduate teaching laboratory. Again this work led to the degree of Master of Engineering.

In Chapter 8 the simulation program is shown used in the teaching of digital gates and systems. Chapter 9 describes a simulation program developed to illustrate the complexity of electrical power engineering systems.

The closing chapter is devoted to a simulator that investigates the behaviour of power semiconductor devices.

The book shows in a unique way how to arouse students' interest and how, in a very effective way, to explain the basic ideas and methods of the Theory of Electrical Engineering. It is an excellent teaching aid for teachers working in this field.

Daniel Mayer

Wolfgang Alt, Andreas Deutsch, Graham Dunn, eds.: DYNAMICS OF CELL AND TISSUE MOTION. Mathematics and Bioscience in Interaction. Birkhäuser, Basel 1997, xvi+336 pages, ISBN 3-7643-5781-9, price DM 118,–.

The process of cell differentiation and pattern formation in morphogenesiss of higher multicelular organisms is one of the central research themes of contemporary biology. This also raises interest to the investigation of cell-cell communications and cell-environment interactions in simple unicellular organisms, which may serve as a good model for more complex phenomena.

The volume under review may be viewed as an outgrowth of a Workshop on Cell and Tissue Motion held in Bonn in March 1995. As the Editors describe in their Introduction, topics of primary importance in the field were identified during a plenary discussion at the workshop and the next year contributions devoted to these topics were collected. The book

is very carefully organized: Altogether, it comprises 33 papers (all of them refereed), which are divided into four chapters. Each chapter has its own coordinators, who provided an Introduction to the chapter reviewing the state of art in the field, and a final Discussion with open problems. Let us list the chapters: I. Motile dynamics at the cellular level—Cytoplasmatic motion and cell shape, II. Dynamics of cell interaction with the environment, III. Dynamics of cell-cell interactions—Collective motion and aggregation, IV. Dynamics within tissues—Morphogenesis and plant movement. All references are deferred to the end of the book, where the reader also finds a detailed Index.

Parallel to the wide range of biological problems discussed is a wide spectrum of mathjematical methods employed in modelling the relevant phenomena, which makes the book appealing for any mathematician interested in applications of mathematics to biology.

Milan Tvrdý

M. Alber, B. Hu, J. Rosenthal, eds.: CURRENT AND FUTURE DIRECTIONS IN APPLIED MATHEMATICS. Birkhäuser, Boston 1997, viii+261 pages, ISBN: 0-8176-3956-X, 3-7643-3956-X, price sFr. 68,–.

The book is devoted to the problem of new trends in applied mathematics (interdisciplinary research between mathematicians and researchers working in engineering business). The book contains the main contributions which were presented at the Symposium on Current and Future Directions in Applied Mathematics organized by the Department of Mathematics at the University of Notre Dame in spring 1996.

We can divide these contributions into two parts. The first is interested generally in current and future trends in the research field. The second part deals with the specific research areas in applied mathematics (Fluid Mechanics, Mechanical Systems with Symmetry, Game Theory, etc.). The book will be a useful guide to anyone, researcher, student, teacher, involved in the applications of mathematics.

Šárka Matušů-Nečasová

Carlo Cercignani, David H. Satinger: SCALING LIMITS AND MODELS IN PHYSICAL PROCESSESS. DMV Seminar Band 28, Birkhäuser Verlag Basel, Boston, Berlin, 1998, 190 pages, ISBN 3-7643-5985-4, price DM 58,–.

This text arose from a series of lectures of the authors on the subject of scaling and mathematical modelling. It is divided into two parts: Scaling and mathematical models in kinetic theory, and Scaling, mathematical modelling & integrable systems. In the first part fundamental ideas leading to Boltzmann equation are introduced, the collision operator is discussed and the relation to macroscopic balance equations is described. Also, in the second chapter, analytical techniques for Boltzmann equation are surveyed, linearized problem, hydrodynamical limit and other scalings are treated in detail. Spectral properties of the corresponding linear operators as well as the decay of semigroups generated by linearized problems are studied.

The second part is devoted to special phenomena as described by nonlinear Schrödinger equation, Korteweg-de Vries equation, etc. connected with dispersion, solitary waves, inverse scattering theory and variational methods. Some numerical methods are also presented to illustrate practical resolution of some dispersive systems of partial differential equations. An up-to-date bibliography makes this book an excellent introduction for those who would like to be well informed about this rapidly developing area of mathematical physics.

Ivo Straškraba