Book reviews

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BOOK REVIEWS

Ch. W. Curtis: PIONEERS OF REPRESENTATION THEORY. Frobenius, Burnside, Schur and Brauer, History of Mathematics, vol. 15, American Mathematical Society, London Mathematical Society, 1999, ISBN 0-8218-9002-6, USD 49.–.

The book under review is devoted to the mathematical achievements of the four important personages mentioned in the title. Quite naturally, results of many other mathematicians are included, and among them I would like to mention especially Emmy Noether. We find in the book basic facts about the lives of Frobenius, Burnside, Schur, Brauer, and Emmy Noether, but it is to understand that this is not a biography but a history of mathematical results and their proofs, written by a highly competent specialist. The book covers the last two decades of the nineteenth century and the first half of the twentieth century. We must especially mention the first chapter which is devoted to the prehistory of the representation theory, and which covers the first eight decades of the nineteenth century. From the mathematical point of view it can bee also considered as an introductory chapter. A reader will find here many definitions and information which he or she will need in the next chapters. Starting from the second chapter the author presents reports on the main papers of Frobenius, Burnside, Schur and Brauer. He brings not only their results, but very often also the relevant proofs or at least sketches of proofs. The material is presented in principal in its historical form, but we meet quite often remarks concerning the contemporary point of view on the subject. Summarizing, we can say that there is quite a lot of history, but even more mathematics. The text is so well organized that the book could almost serve also as a textbook. Frankly, I do not actually intend to recommend it as a textbook, but if you have already at least a modest knowledge of the representation theory, you will find the reading really very interesting.

Jiří Vanžura, Brno

Phillip I. Good: RESAMPLING METHODS: A PRACTICAL GUIDE TO DATA ANALYSIS. Second edition, Birkhäuser, Boston, 2001, XII + 238 pages, ISBN 0-8176-4243-9, EUR 90.–.

The book is the second partially revised edition of the nicely and wittily written guide to resampling methods based on permutations, cross-validation and the bootstrap. The text "... intended for class use or self-study aspires to introduce statistical methodology to a wide audience simply and intuitively, through resampling data at hand". Step by step the reader is led to the art of organizing an experiment, understanding and feeling the data, the interpretation and presentation of results. The concepts of random sampling, probability distribution, independence, estimation of parameters, hypothesis testing, power of tests, robustness, classification and discrimination are simply and elegantly explained. The use and properties of statistical methods presented are elucidated by numerous examples and exercises.

Jiří Vondráček, Praha

V. Turaev: INTRODUCTION TO COMBINATORIAL TORSIONS. Lectures in Mathematics, ETH Zürich, Birkhäuser, Basel, 2001, 136 pages, ISBN 3-7643-6403-3, DM 38.–.

Though the author asserts in the introduction that this book is not a systematic treatise on torsions, I think that it can very well serve both as an introduction to the subject and as an introduction to the research in this field. It is concisely, but very clearly written. It consists of only three chapters. The first chapter brings the necessary algebraic preliminaries to the theory of torsions. The second chapter already has topological character. Various torsions of CW-complexes are introduced here (Reidemeister-Franz torsion, Whitehead torsion, Milnor torsion, maximal abelian torsion) and their topological applications are presented. We find here e.g. how the Reidemeister torsion behaves in relation with simple homotopy equivalences, application of the Reidemeister-Franz torsion to the classification of lens spaces, equality between the Alexander function and the Milnor torsion, torsions of manifolds, and connections with the Alexander polynomial of a link. The last third chapter deals with refined torsions, and we meet here topics concerning homology orientations and Euler structures. Most of these results are due to V. Turaev himself. We find here also relations between torsions and the Seiberg-Witten invariant. The book reads very well and surprisingly it contains many definitions and theorems which make the text accessible also for specialists from quite remote fields. (We can find here for example even the definition of a CW-complex!) Many examples make the reading very interesting.

Jiří Vanžura, Brno

Keqin Gu, Vladimir L. Kharitonov, Jie Chen: STABILITY OF TIME-DELAY SYSTEMS. Birkhäuser, Basel, 2003, 276 pages, hardcover, EUR 95.–.

The book is devoted to the study of stability of systems with delays. It consists of eight chapters. Chapter 1 contains an extensive introduction to the theory of functional differential equations and gives a number of characteristic examples illustrating the role played by time delays in differential models. Part I (Chapters 2–4) is devoted to the frequency-domain approach to the investigation of stability of linear systems with delays. Chapters 2 and 3 deal with systems involving multiple delays which may be both commensurate and incommensurate. In Chapter 4, the authors study the stability problem for systems containing some uncertain coeficients. Time-domain methods are developed in Part II (Chapters 5–7), where systems with single, multiple, and distributed delays are studied. The results established there are based on the Lyapunov-Krasovskii Theorem and the Razumikhin Theorem. In the last part (Chapter 8), the input-output stability framework is discussed.

The metods developed in the book are described in detail and illustrated by numerous examples. The book covers a wide range of topics in stability theory of delay systems, the exposition is self-contained, and the necessary technical preliminaries are integrated into the text. It may be useful either for self-study or as a convenient reference book.

Jiří Šremr, Brno