

Book reviews

Mathematica Bohemica, Vol. 126 (2001), No. 1, 255–256

Persistent URL: <http://dml.cz/dmlcz/133917>

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BOOK REVIEWS

Y. A. Melnikov: INFLUENCE FUNCTIONS AND MATRICES. Marcel Dekker, New York, x+469 pages, \$ 185,-.

From the mathematical point of view this book represents an exhaustive collection of case studies using the technique of Green's functions (or influence functions) for various boundary value problems originating mostly in applied mechanics. The text is intended as a tool for graduate students of mechanical engineering and applied mathematics. There is a large collection of Green's functions for various type problems involving ordinary differential equations as well as some partial differential equations. Some computational aspects of the technique of Green's functions are also dealt with in this useful book.

Štefan Schwabik, Praha

S. Bagdasarov: CHEBYSHEV SPLINES AND KOLMOGOROV INEQUALITIES. Operator Theory, Advances and Applications, vol. 105, Birkhäuser, Basel, 1998, 205 pages, DM 178,-.

The monograph deals with several extremal (optimization) problems. The main of them are the Kolmogorov-Landau problem of the best estimates of the norms of intermediate derivatives, maximization of integral functionals with special kernels and problems of Kolmogorov N -width. The optimization is performed in classes (spaces) of functions with derivatives integrable in some power in one dimension. Special case of spaces considered are Sobolev spaces.

Chebyshev perfect splines which are characterized by the fact that their r -th derivatives alternate between 1 and -1 on adjacent intervals realize extremum of one kind of the considered functionals. No other context of the spline functions is considered.

The author has in recent years generalized these investigations to the class $W^r H^\omega$ defined with help of the concave modulus of continuity ω . These results are the main contents of the book.

In the introduction, the author gives a nice historical overview of the Kolmogorov-Landau problem. The book has 93 items of bibliography and a short index.

The monograph presents many fine results, its study will not be easy but it will certainly be useful for an erudite specialist in optimization problems and function spaces.

M. Práger, Praha

A. Dijkma, I. Gohberg, M. A. Kaashoek, R. Menmincken (eds.): CONTRIBUTIONS TO OPERATOR THEORY IN SPACES WITH AN INDEFINITE METRIC. The Heinz Langer Anniversary Volume, Operator Theory, Advances and Applications, vol. 106, Birkhäuser, Basel, 1998, DM 198,-.

The book is devoted to Heinz Langer, one of the leading experts in the spectral analysis of operators, on the occasion of his 60th birthday.

Apart from the biography and the list of publications of H. Langer the volume contains a selection of more than 20 research papers devoted especially to operators in spaces with an indefinite metric. Other papers deal with operator pencils, spectral theory of operators

and interpolation problems. Special attention is paid also to applications to ordinary and partial differential equations, time-varying systems and mathematical physics.

Vladimír Müller, Praha

H. J. Leisi: KLASSISCHE PHYSIK. BD. II: ELEKROMAGNETISMUS UND WÄRME. Birkhäuser, Basel, 1998, vi + 472 pages, 209 Fig's, ISBN 3-7643-5977-3, DM 68,-.

This is the second volume of a textbook destined for the propaedeutic course of physics for undergraduate students of physics, mathematics, chemistry and engineering. The basic features of the textbook were already reported in connection with its first volume (Mechanics—Math. Bohem. 123 (1998), 443) and will not be repeated here. Only the origin of the book will be recalled—it is based on the lectures held by the author at the ETH Zürich as a one year course the second semester of which is covered by the present volume.

The book opens with a recapitulation of the four basic types of physical forces followed by the four chapters on the electromagnetism: Electrostatics, Electric Currents, Non-stationary Fields, Electromagnetic Waves. The second part concerned with the heat contains four chapters: Many Particle Systems—Concepts, Kinetic Theory of Heat, First and Second Laws of Thermodynamics. The book is closed by a short overview on physical units and by a table of the most important physical constants.

The style of the first volume is retained, the excellent figures constitute an important component of the book and are quite unseparable from the text. The emphasis laid on demonstrations and on carefully explained illustrative examples is even greater, in particular in the first part, because of somewhat descriptive nature of the elements of electromagnetism. 38 cleverly selected demonstration experiments try to open and shed some light into the black box of electromagnetic phenomena. At least the “direct” measurement of the velocity of electrons in an electric circuit by means of the Hall effect, observation of effects accompanying the propagation of waves in a coaxial cable and a demonstration of the resonance fluorescence deserve to be mentioned. The understanding of the explained matter is also continually checked and strengthened in 47 solved exercises. The insistence being laid on the concepts, only a cursory attention is given to applications; they are only shortly recalled or left to exercises.

The part concerned with the heat and amounting to about a third of the book is somewhat less systematic. It may be that the author preferred to include everything important before a logical construction. Again, the exposition is accompanied by 10 demonstration experiments, several examples discussed in detail and by 29 solved exercises.

The concluding recommendation of the report on the first volume of Classical Physics can be repeated here. The book will certainly be appreciated by undergraduate students and perhaps also by their teachers as a source of illustrative experiments and exercises and as an example of successfully combining simplicity with correctness.

Ivan Saxl, Praha