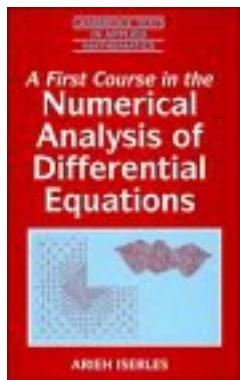


# A First Course in the Numerical Analysis of Differential Equations



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Numerical analysis presents different faces to the world. For mathematicians it is a bona fide mathematical theory with an applicable flavour. For scientists and engineers it is a practical, applied subject, part of the standard repertoire of modelling techniques. For computer scientists it is a theory on the interplay of computer architecture and algorithms for real-number calculations. The tension between these standpoints is the driving force of this book, which presents a rigorous account of the fundamentals of numerical analysis of both ordinary and partial differential equations. The point of departure is mathematical but the exposition strives to maintain a balance between theoretical, algorithmic and applied aspects of the subject. In detail, topics covered include numerical solution of ordinary differential equations by multistep and Runge-Kutta methods; finite difference and finite elements techniques for the Poisson equation; a variety of algorithms to solve large, sparse algebraic systems; methods for parabolic and hyperbolic differential equations and techniques of their analysis. The book is accompanied by an appendix that presents brief back-up in a number of mathematical topics. Dr Iserles concentrates on fundamentals: deriving methods from first principles, analysing them with a variety of mathematical

techniques and occasionally discussing questions of implementation and applications. By doing so, he is able to lead the reader to theoretical understanding of the subject without neglecting its practical aspects. The outcome is a textbook that is mathematically honest and rigorous and provides its target audience with a wide range of skills in both ordinary and partial differential equations.

作者介绍:

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