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Titolo	Elliptic Differential Equations : Theory and Numerical Treatment // by Wolfgang Hackbusch
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Descrizione fisica	1 online resource (XIV, 455 p. 55 illus., 15 illus. in color.)
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Disciplina	515.353
Soggetti	Mathematical analysis Analysis (Mathematics) Numerical analysis System theory Calculus of variations Mathematical physics Analysis Numerical Analysis Systems Theory, Control Calculus of Variations and Optimal Control; Optimization Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	1 Partial Differential Equations and Their Classification Into Types -- 2 The Potential Equation -- 3 The Poisson Equation -- 4 Difference Methods for the Poisson Equation -- 5 General Boundary Value Problems -- 6 Tools from Functional Analysis -- 7 Variational Formulation -- 8 The Method of Finite Elements -- 9 Regularity -- 10 Special Differential Equations -- 11 Eigenvalue Problems -- 12 Stokes Equations.
Sommario/riassunto	This book simultaneously presents the theory and the numerical treatment of elliptic boundary value problems, since an understanding of the theory is necessary for the numerical analysis of the discretisation. It first discusses the Laplace equation and its finite

difference discretisation before addressing the general linear differential equation of second order. The variational formulation together with the necessary background from functional analysis provides the basis for the Galerkin and finite-element methods, which are explored in detail. A more advanced chapter leads the reader to the theory of regularity. Individual chapters are devoted to singularly perturbed as well as to elliptic eigenvalue problems. The book also presents the Stokes problem and its discretisation as an example of a saddle-point problem taking into account its relevance to applications in fluid dynamics.
