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Altri autori (Persone)	ConstandaC (Christian) PotapenkoS (Stanislav)
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Superconvergence of Projection Methods for Weakly Singular Integral Operators -- On Acceleration of Spectral Computations for Integral Operators with Weakly Singular Kernels -- Numerical Solution of Integral Equations in Solidification and Melting with Spherical Symmetry -- An Analytic Solution for the Steady-State Two-Dimensional Advection–Diffusion–Deposition Model by the GILTT Approach -- Analytic Two-Dimensional Atmospheric Pollutant Dispersion Simulation by Double GITT -- Transient Acoustic Radiation from a Thin Spherical Elastic Shell -- The Eigenfrequencies and Mode Shapes of Drilling Masts -- Layer Potentials in Dynamic Bending of Thermoelastic Plates -- Direct Methods in the Theory of Thermoelastic Plates -- The Dirichlet Problem for the Plane Deformation of a Thin Plate on an Elastic Foundation -- Some Remarks on Homogenization in Perforated Domains -- Dynamic Response of a Poroelastic Half-Space to Harmonic Line Tractions -- Convexity Conditions and Uniqueness and Regularity

of Equilibria in Nonlinear Elasticity -- The Mathematical Modeling of Syringomyelia -- A System Iterative Method for Solving First-Kind, Degraded Identity Operator Equations -- Fast Numerical Integration Method Using Taylor Series -- Boundary Integral Solution of the Two-Dimensional Fractional Diffusion Equation -- About Traces, Extensions, and Co-Normal Derivative Operators on Lipschitz Domains -- On the Extension of Divergence-Free Vector Fields Across Lipschitz Interfaces -- Solutions of the Atmospheric Advection–Diffusion Equation by the Laplace Transformation -- On Quasimodes for Spectral Problems Arising in Vibrating Systems with Concentrated Masses -- Two-Sided Estimates for Local Minimizers in Compressible Elasticity -- Harmonic Oscillations in a Linear Theory of Antiplane Elasticity with Microstructure -- Exterior Dirichlet and Neumann Problems for the Helmholtz Equation as Limits of Transmission Problems -- Direct Boundary Element Method with Discretization of All Integral Operators -- Reciprocity in Elastomechanics: Development of Explicit Results for Mixed Boundary Value Problems -- Integral Equation Modeling of Electrostatic Interactions in Atomic Force Microscopy -- Integral Representation for the Solution of a Crack Problem Under Stretching Pressure in Plane Asymmetric Elasticity -- Euler–Bernoulli Beam with Energy Dissipation: Spectral Properties and Control -- Correct Equilibrium Shape Equation of Axisymmetric Vesicles -- Properties of Positive Solutions of the Falkner–Skan Equation Arising in Boundary Layer Theory -- Stabilization of a Four-Dimensional System under Real Noise Excitation.

Sommario/riassunto

The physical world is studied by means of mathematical models, which consist of differential, integral, and integro-differential equations accompanied by a large assortment of initial and boundary conditions. In certain circumstances, such models yield exact analytic solutions. When they do not, they are solved numerically by means of various approximation schemes. Whether analytic or numerical, these solutions share a common feature: they are constructed by means of the powerful tool of integration—the focus of this self-contained book. An outgrowth of the Ninth International Conference on Integral Methods in Science and Engineering, this work illustrates the application of integral methods to diverse problems in mathematics, physics, biology, and engineering. The thirty two chapters of the book, written by scientists with established credentials in their fields, contain state-of-the-art information on current research in a variety of important practical disciplines. The problems examined arise in real-life processes and phenomena, and the solution techniques range from theoretical integral equations to finite and boundary elements. Specific topics covered include spectral computations, atmospheric pollutant dispersion, vibration of drilling masts, bending of thermoelastic plates, homogenization, equilibria in nonlinear elasticity, modeling of syringomyelia, fractional diffusion equations, operators on Lipschitz domains, systems with concentrated masses, transmission problems, equilibrium shape of axisymmetric vesicles, boundary layer theory, and many more. Integral Methods in Science and Engineering is a useful and practical guide to a variety of topics of interest to pure and applied mathematicians, physicists, biologists, and civil and mechanical engineers, at both the professional and graduate student level. .