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Nota di contenuto	List of figures -- List of examples -- Nomenclature -- Preface -- Acknowledgment -- About the author -- Part I. Classical methods in fluid flow and heat transfer -- 1. Methods in heat transfer of solids -- 1.1 Historical notes -- 1.2 Heat conduction equation and problem formulation -- 1.2.1 Cartesian coordinates -- 1.2.2 Orthogonal curvilinear coordinates -- 1.2.3 Universal function for heat flux on an arbitrary nonisothermal surface -- 1.2.4 Initial, boundary, and conjugate conditions -- Exercises 1.1-1.12 -- 1.3 Solution using error integral -- 1.3.1 An infinite solid or thin, laterally insulated rod -- 1.3.2 A semi-infinite solid or thin, laterally insulated rod -- 1.4 Duhamel's method -- 1.4.1 Duhamel integral derivation -- 1.4.2 Time-dependent surface temperature -- Exercises 1.13-1.27 -- 1.5 Method of separation variables -- 1.5.1 General approach, homogeneous, and inhomogeneous problems -- 1.5.2 One-dimensional unsteady problems -- 1.5.3 Orthogonality of Eigenfunctions -- Exercises 1.28-1.43 -- 1.5.4 Two-dimensional steady problems -- 1.6 Integral transforms -- 1.6.1 Fourier transform -- 1.6.2 Laplace transform -- 1.7 Green's function method --

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Sommario/riassunto

This book presents contemporary theoretical methods in fluid flow and heat transfer, emphasizing principles of investigation and modeling of natural phenomena and engineering processes. It is organized into four parts and 12 chapters presenting classical and modern methods. Following the classical methods in Part 1, Part 2 offers in-depth coverage of analytical conjugate methods in convective heat transfer and peristaltic flow. Part 3 explains recent developments in numerical methods including new approaches for simulation of turbulence by direct solution of Navier-Stokes equations. Part 4 provides a wealth of applications in industrial systems, technology processes, biology, and medicine. More than a hundred examples show the applicability of the methods in such areas as nuclear reactors, aerospace, crystal growth, turbine blades, electronics packaging, optical fiber coating, wire casting, blood flow, urinary problems, and food processing.
