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Nota di contenuto	1 Introduction -- 2 Diffusion -- 3 The Laplace Equation -- 4 Scalar Conservation Laws and First Order Equations -- 5 Waves and vibrations -- 6 Elements of Functional Analysis -- 7 Distributions and Sobolev Spaces -- 8 Variational formulation of elliptic problems -- 9 Further Applications -- 10 Weak Formulation of Evolution Problems -- 11 Systems of Conservation Laws -- 12 A Fourier Series -- 13 B Measures and Integrals -- 14 C Identities and Formulas.
Sommario/riassunto	The book is intended as an advanced undergraduate or first-year graduate course for students from various disciplines, including applied mathematics, physics and engineering. It has evolved from courses offered on partial differential equations (PDEs) over the last several years at the Politecnico di Milano. These courses had a twofold purpose: on the one hand, to teach students to appreciate the interplay between theory and modeling in problems arising in the applied

sciences, and on the other to provide them with a solid theoretical background in numerical methods, such as finite elements. Accordingly, this textbook is divided into two parts. The first part, chapters 2 to 5, is more elementary in nature and focuses on developing and studying basic problems from the macro-areas of diffusion, propagation and transport, waves and vibrations. In turn the second part, chapters 6 to 11, concentrates on the development of Hilbert spaces methods for the variational formulation and the analysis of (mainly) linear boundary and initial-boundary value problems.