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Nota di contenuto	Distributions and function spaces -- Elliptic boundary-value problems -- Finite difference approximation of parabolic problems -- Finite difference approximation of hyperbolic problems.
Sommario/riassunto	This book develops a systematic and rigorous mathematical theory of finite difference methods for linear elliptic, parabolic and hyperbolic partial differential equations with nonsmooth solutions. Finite difference methods are a classical class of techniques for the numerical approximation of partial differential equations. Traditionally, their convergence analysis presupposes the smoothness of the coefficients, source terms, initial and boundary data, and of the associated solution to the differential equation. This then enables the application of elementary analytical tools to explore their stability and accuracy. The assumptions on the smoothness of the data and of the associated analytical solution are however frequently unrealistic. There is a wealth of boundary – and initial – value problems, arising from various applications in physics and engineering, where the data and the corresponding solution exhibit lack of regularity. In such instances classical techniques for the error analysis of finite difference schemes break down. The objective of this book is to develop the mathematical theory of finite difference schemes for linear partial differential equations with nonsmooth solutions. Analysis of Finite Difference Schemes is aimed at researchers and graduate students interested in the mathematical theory of numerical methods for the approximate

solution of partial differential equations.
