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Sommario/riassunto	This textbook provides a self-contained and elementary introduction to the modern theory of pseudodifferential operators and their applications to partial differential equations. In the first chapters, the necessary material on Fourier transformation and distribution theory is presented. Subsequently the basic calculus of pseudodifferential operators on the n-dimensional Euclidean space is developed. In order to present the deep results on regularity questions for partial differential equations, an introduction to the theory of singular integral operators is given - which is of interest for its own. Moreover, to get a wide range of applications, one chapter is devoted to the modern theory of Besov and Bessel potential spaces. In order to demonstrate some fundamental approaches and the power of the theory, several applications to wellposedness and regularity question for elliptic and parabolic equations are presented throughout the book. The basic notation of functional analysis needed in the book is introduced and summarized in the appendix. The text is comprehensible for students of mathematics and physics with a basic education in analysis.