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**Sinopsis**

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The main subject of this book is applications of methods of scattering theory to differential operators, primarily the Schrödinger operator.

There are two different trends in scattering theory for differential operators. The first one relies on the abstract scattering theory. The second one is almost independent of it. In this approach the abstract theory is replaced by a concrete investigation of the corresponding differential equation. In this book both of these trends are presented. The first half of this book begins with the summary of the main results of the general scattering theory of the previous book by the author, *Mathematical Scattering Theory: General Theory*, American Mathematical Society, 1992. The next three chapters illustrate basic theorems of abstract scattering theory, presenting, in particular, their applications to scattering theory of perturbations of differential operators with constant coefficients and to the analysis of the trace class method.

In the second half of the book direct methods of scattering theory for differential operators are presented. After considering the one-dimensional case, the author returns to the multi-dimensional problem and discusses various analytical methods and tools appropriate for the analysis of differential operators, including, among others, high- and low-energy asymptotics of the Green function, the scattering matrix, ray and eikonal expansions.

The book is based on graduate courses taught by the author at Saint-Petersburg (Russia) and Rennes (France) Universities and is oriented towards a reader interested in studying deep aspects of scattering theory (for example, a graduate student in mathematical physics).