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Sommario/riassunto	This volume presents a mathematical development of a recent approach to the modeling and simulation of turbulent flows based on methods for the approximate solution of inverse problems. The resulting Approximate Deconvolution Models or ADMs have some advantages over more commonly used turbulence models – as well as some disadvantages. Our goal in this book is to provide a clear and complete mathematical development of ADMs, while pointing out the difficulties that remain. In order to do so, we present the analytical theory of ADMs, along with its connections, motivations and complements in the phenomenology of and algorithms for ADMs.