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Sommario/riassunto	The topic of this book is the mathematical and numerical analysis of some recent frameworks based on differential equations and their application in the mathematical modeling of complex systems, especially of living matter. First, the recent new mathematical frameworks based on generalized kinetic theory, fractional calculus, inverse theory, Schrodinger equation, and Cahn-Hilliard systems are presented and mathematically analyzed. Specifically, the well-posedness of the related Cauchy problems is investigated, stability analysis is also performed (including the possibility to have Hopf bifurcations), and some optimal control problems are presented. Second, this book is concerned with the derivation of specific models within the previous mentioned frameworks and for complex systems in biology, epidemics, and engineering. This book is addressed to graduate students and applied mathematics researchers involved in the mathematical modeling of complex systems.