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	Sommario/riassunto	The present book contains the articles published in the Special Issue "Differential Equation Models in Applied Mathematics: Theoretical and Numerical Challenges" of the MDPI journal Mathematics. The Special Issue aimed to highlight old and new challenges in the formulation, solution, understanding, and interpretation of models of differential equations (DEs) in different real world applications. The technical topics covered in the seven articles published in this book include: asymptotic properties of high order nonlinear DEs, analysis of backward bifurcation, and stability analysis of fractional-order differential systems. Models oriented to real applications consider the chemotactic between cell species, the mechanism of on-off intermittency in food chain models, and the occurrence of hysteresis in marketing. Numerical aspects deal with the preservation of mass and positivity and the efficient solution of Boundary Value Problems (BVPs) for optimal control problems. I hope that this collection will be useful for those working in the area of modelling real-word applications through differential equations and those who care about an accurate numerical approximation of their solutions. The reading is also addressed to those willing to become familiar with differential equations which, due to their predictive abilities, represent the main mathematical tool for applying scenario analysis to our changing world.