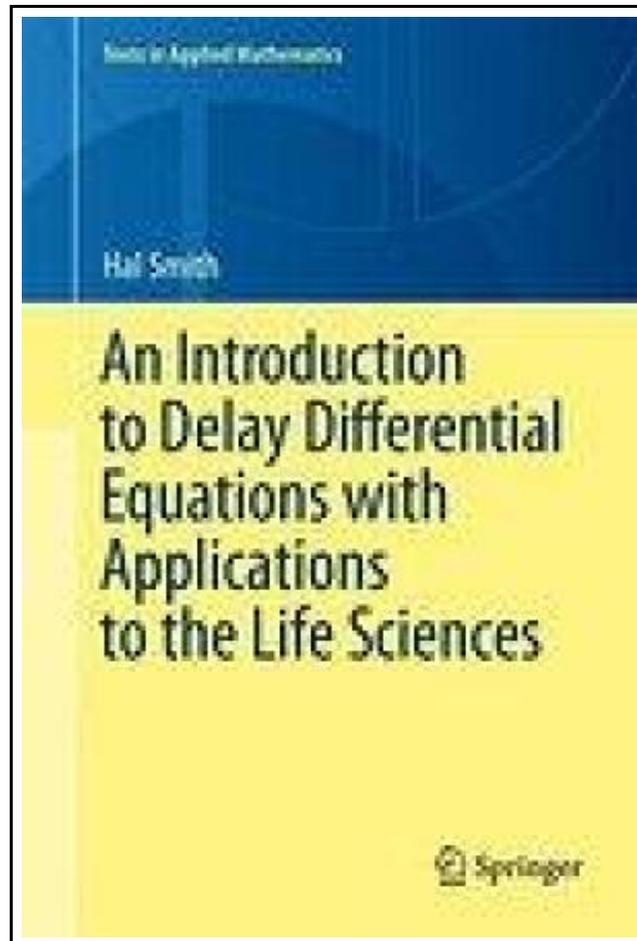# An Introduction to Delay Differential Equations with Applications to the Life Sciences

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AN INTRODUCTION TO DELAY DIFFERENTIAL EQUATIONS WITH APPLICATIONS TO THE LIFE SCIENCES

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Springer Dez 2012, 2012. Taschenbuch. Book Condition: Neu. 235x155x10 mm. This item is printed on demand - Print on Demand Titel. Neuware - This book is intended to be an introduction to Delay Differential Equations for upper level undergraduates or beginning graduate mathematics students who have a good background in ordinary differential equations and would like to learn about the applications. It may also be of interest to applied mathematicians, computational scientists, and engineers. It focuses on key tools necessary to understand the applications literature involving delay equations and to construct and analyze mathematical models. Aside from standard well-posedness results for the initial value problem, it focuses on stability of equilibria via linearization and Lyapunov functions and on Hopf bifurcation. It contains a brief introduction to abstract dynamical systems focused on those generated by delay equations, introducing limit sets and their properties. Differential inequalities play a significant role in applications and are treated here, along with an introduction to monotone systems generated by delay equations. The book contains some quite recent results such as the Poincare-Bendixson theory for monotone cyclic feedback systems, obtained by Mallet-Paret and Sell. The linear chain trick for a special family of infinite delay equations is treated. The book is distinguished by the wealth of examples that are introduced and treated in detail. These include the delayed logistic equation, delayed chemostat model of microbial growth, inverted pendulum with delayed feedback control, a gene regulatory system, and an HIV transmission model. An entire chapter is devoted to the interesting dynamics exhibited by a chemostat model of bacteriophage parasitism of bacteria. The book has a large number of exercises and illustrations. Hal Smith is a Professor at the School of Mathematical and Statistical Sciences at Arizona State University. This book is intended to be an introduction to Delay...

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