



Stephen Lynch

Dynamical Systems with Applications Using MATLAB[®]

Third Edition

Dynamical Systems With Applications Using Matlab

Robert R. Redfield



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giving so many worked examples provides ample opportunity for experiments It is well written and a pleasure to read which is helped by its attention to historical background Mathematical Reviews Review of First Edition Since the first edition of this book was published in 2001 Maple™ has evolved from Maple V into Maple 13 Accordingly this new edition has been thoroughly updated and expanded to include more applications examples and exercises all with solutions two new chapters on neural networks and simulation have also been added There are also new sections on perturbation methods normal forms Gr bner bases and chaos synchronization The work provides an introduction to the theory of dynamical systems with the aid of Maple The author has emphasized breadth of coverage rather than fine detail and theorems with proof are kept to a minimum Some of the topics treated are scarcely covered elsewhere Common themes such as bifurcation bistability chaos instability multistability and periodicity run through several chapters The book has a hands on approach using Maple as a pedagogical tool throughout Maple worksheet files are listed at the end of each chapter and along with commands programs and output may be viewed in color at the author s website Additional applications and further links of interest may be found at Maplesoft s Application Center Dynamical Systems with Applications using Maple is aimed at senior undergraduates graduate students and working scientists in various branches of applied mathematics the natural sciences and engineering ISBN 978 0 8176 4389 8 Also by the author Dynamical Systems with Applications using MATLAB ISBN 978 0 8176 4321 8 Dynamical Systems with Applications using Mathematica ISBN 978 0 8176 4482 6

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introduction to the theory of dynamical systems with the aid of the Maple algebraic manipulation package It is written for both senior undergraduates and graduate students The first part of the book deals with continuous systems using ordinary differential equations Chapters 1-10 the second part is devoted to the study of discrete dynamical systems Chapters 11-15 and Chapters 16-18 deal with both continuous and discrete systems Chapter 19 lists examination type questions used by the author over many years one set to be used in a computer laboratory with access to Maple and the other set to be used without access to Maple Chapter 20 lists answers to all of the exercises given in the book It should be pointed out that dynamical systems theory is not limited to these topics but also encompasses partial differential equations integral and integro-differential equations stochastic systems and time delay systems for instance References 1-5 given at the end of the Preface provide more information for the interested reader

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Stephen Lynch, 2008-11-01 This book provides an introduction to the theory of dynamical systems with the aid of the Mathematica computer algebra package The book has a very hands on approach and takes the reader from basic theory to recently published research material Emphasized throughout are numerous applications to biology chemical kinetics economics electronics epidemiology nonlinear optics mechanics population dynamics and neural networks Theorems and proofs are kept to a minimum The first section deals with continuous systems using ordinary differential equations while the second part is devoted to the study of discrete dynamical systems

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Nicolae Lobontiu, 2017-08-29 Engineering system dynamics focuses on deriving mathematical models based on simplified physical representations of actual systems such as mechanical electrical fluid or thermal and on solving these models for analysis or design purposes System Dynamics for Engineering Students Concepts and Applications features a classical approach to system dynamics and is designed to be utilized as a one semester system dynamics text for upper level undergraduate students with emphasis on mechanical aerospace or electrical engineering It is the first system dynamics textbook to include examples from compliant flexible mechanisms and micro nano electromechanical systems MEMS NEMS This new second edition has been updated to provide more balance between analytical and computational approaches introduces additional in text coverage of Controls and includes numerous fully solved examples and exercises Features a more balanced treatment of mechanical electrical fluid and thermal systems than other texts Introduces examples from compliant flexible mechanisms and MEMS NEMS Includes a chapter on coupled field systems Incorporates MATLAB and Simulink computational software tools throughout the book Supplements the text with extensive instructor support available online instructor's solution manual image bank and PowerPoint lecture slides NEW FOR THE SECOND EDITION Provides more balance between analytical and computational approaches including integration of Lagrangian equations as another modelling technique of dynamic systems Includes additional in text coverage of Controls to meet the needs of schools that cover both controls and system dynamics in the course Features a broader range of applications including additional

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