

1. Record Nr.	UNISA996203214403316
Autore	Nayfeh Ali Hasan <1933->
Titolo	Applied nonlinear dynamics [[electronic resource]] : analytical, computational, and experimental methods // Ali H. Nayfeh, Balakumar Balachandran
Pubbl/distr/stampa	New York, : Wiley, c1995
ISBN	1-282-01051-4 9786612010514 3-527-61754-X 3-527-61755-8
Descrizione fisica	1 online resource (703 p.)
Collana	Wiley series in nonlinear science
Altri autori (Persone)	BalachandranBalakumar
Disciplina	515.35 621.38131
Soggetti	Dynamics Nonlinear theories
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"A Wiley-Interscience publication."
Nota di bibliografia	Includes bibliographical references (p. 589-661) and index.
Nota di contenuto	APPLIED NONLINEAR DYNAMICS; CONTENTS; PREFACE; 1 INTRODUCTION; 1.1 DISCRETE-TIME SYSTEMS; 1.2 CONTINUOUS-TIME SYSTEMS; 1.2.1 Nonautonomous Systems; 1.2.2 Autonomous Systems; 1.2.3 Phase Portraits and Flows; 1.3 ATTRACTING SETS; 1.4 CONCEPTS OF STABILITY; 1.4.1 Lyapunov Stability; 1.4.2 Asymptotic Stability; 1.4.3 Poincare Stability; 1.4.4 Lagrange Stability (Bounded Stability); 1.4.5 Stability Through Lyapunov Function; 1.5 ATTRACTORS; 1.6 COMMENTS; 1.7 EXERCISES; 2 EQUILIBRIUM SOLUTIONS; 2.1 CONTINUOUS-TIME SYSTEMS; 2.1.1 Linearization Near an Equilibrium Solution 2.1.2 Classification and Stability of Equilibrium Solutions 2.1.3 Eigenspaces and Invariant Manifolds; 2.1.4 Analytical Construction of Stable and Unstable Manifolds; 2.2 FIXED POINTS OF MAPS; 2.3 BIFURCATIONS OF CONTINUOUS SYSTEMS; 2.3.1 Local Bifurcations of Fixed Points; 2.3.2 Normal Forms for Bifurcations; 2.3.3 Bifurcation Diagrams and Sets; 2.3.4 Center Manifold Reduction; 2.3.5 The Lyapunov-Schmidt Method; 2.3.6 The Method of Multiple Scales; 2.3.7

Structural Stability; 2.3.8 Stability of Bifurcations to Perturbations; 2.3.9 Codimension of a Bifurcation; 2.3.10 Global Bifurcations
 2.4 BIFURCATIONS OF MAPS 2.5 EXERCISES; 3 PERIODIC SOLUTIONS; 3.1 PERIODIC SOLUTIONS; 3.1.1 Autonomous Systems; 3.1.2 Nonautonomous Systems; 3.1.3 Comments; 3.2 FLOQUET THEORY; 3.2.1 Autonomous Systems; 3.2.2 Nonautonomous Systems; 3.2.3 Comments on the Monodromy Matrix; 3.2.4 Manifolds of a Periodic Solution; 3.3 POINCARÉ MAPS; 3.3.1 Nonautonomous Systems; 3.3.2 Autonomous Systems; 3.4 BIFURCATIONS; 3.4.1 Symmetry-Breaking Bifurcation; 3.4.2 Cyclic-Fold Bifurcation; 3.4.3 Period-Doubling or Flip Bifurcation; 3.4.4 Transcritical Bifurcation; 3.4.5 Secondary Hopf or Neimark Bifurcation
 3.5 ANALYTICAL CONSTRUCTIONS 3.5.1 Method of Multiple Scales; 3.5.2 Center Manifold Reduction; 3.5.3 General Case; 3.6 EXERCISES; 4 QUASIPERIODIC SOLUTIONS; 4.1 POINCARÉ MAPS; 4.1.1 Winding Time and Rotation Number; 4.1.2 Second-Order Poincaré Map; 4.1.3 Comments; 4.2 CIRCLE MAP; 4.3 CONSTRUCTIONS; 4.3.1 Method of Multiple Scales; 4.3.2 Spectral Balance Method; 4.3.3 Poincaré Map Method; 4.4 STABILITY; 4.5 SYNCHRONIZATION; 4.6 EXERCISES; 5 CHAOS; 5.1 MAPS; 5.2 CONTINUOUS-TIME SYSTEMS; 5.3 PERIOD-DOUBLING SCENARIO; 5.4 INTERMITTENCY MECHANISMS; 5.4.1 Type I Intermittency
 5.4.2 Type III Intermittency 5.4.3 Type II Intermittency; 5.5 QUASIPERIODIC ROUTES; 5.5.1 Ruelle-Takens Scenario; 5.5.2 Torus Breakdown; 5.5.3 Torus Doubling; 5.6 CRISES; 5.7 MELNIKOV THEORY; 5.7.1 Homoclinic Tangles; 5.7.2 Heteroclinic Tangles; 5.7.3 Numerical Prediction of Manifold Intersections; 5.7.4 Analytical Prediction of Manifold Intersections; 5.7.5 Application of Melnikov's Method; 5.7.6 Comments; 5.8 BIFURCATIONS OF HOMOCLINIC ORBITS; 5.8.1 Planar Systems; 5.8.2 Orbits Homoclinic to a Saddle; 5.8.3 Orbits Homoclinic to a Saddle Focus; 5.8.4 Comments; 5.9 EXERCISES
 6 NUMERICAL METHODS

Sommario/riassunto

A unified and coherent treatment of analytical, computational and experimental techniques of nonlinear dynamics with numerous illustrative applications. Features a discourse on geometric concepts such as Poincaré maps. Discusses chaos, stability and bifurcation analysis for systems of differential and algebraic equations. Includes scores of examples to facilitate understanding.