

BIO-INSPIRED EMERGENT CONTROL OF LOCOMOTION SYSTEMS

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Bioinspired Emergent Control Of Locomotion Systems

World Scientific Series On Nonlinear Science S

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Nonlinear Dynamics Perspective Of Wolfram's New Kind Of Science, A (In 2 Volumes) - Volume I Leon O

Chua,2006-06-08 This novel book introduces cellular automata from a rigorous nonlinear dynamics perspective It supplies the missing link between nonlinear differential and difference equations to discrete symbolic analysis A surprisingly useful interpretations of cellular automata in terms of neural networks is also given The book provides a scientifically sound and original analysis and classifications of the empirical results presented in Wolfram s monumental New Kind of Science

Control of Chaos in Nonlinear Circuits and Systems Wing-Kuen Ling,2009 In this book leading researchers present their current work in the challenging area of chaos control in nonlinear circuits and systems with emphasis on practical methodologies system design techniques and applications A combination of overview tutorial and technical articles the book describes state of the art research on significant problems in this area The scope and aim of this book are to bridge the gap between chaos control methods and circuits and systems It is an ideal starting point for anyone who needs a fundamental understanding of controlling chaos in nonlinear circuits and systems

Chua's Circuit Implementations Luigi Fortuna,2009 Since the birth of the Chua circuit in 1983 a considerable number of fruitful fascinating and relevant research topics have arisen In honor of the 25th anniversary of the invention of Chua s circuit this book presents the 25 years of research on the implementation of Chua s circuit and also discusses future directions and emerging applications of recent results The purpose of the book is to provide researchers PhD students and undergraduate students a research monograph containing both fundamentals on the topics and advanced results that have been recently obtained With about 60 illustrations included in the book it also shows the detailed schematics of several different implementations that can be easily reproduced with a low cost experimental setup and PC based measurement instrumentation

Strange Nonchaotic Attractors: Dynamics Between Order And Chaos In Quasiperiodically Forced Systems Arkady S Pikovsky,Ulrike Feudel,Sergey P Kuznetsov,2006-04-26 This book is the first monograph devoted exclusively to strange nonchaotic attractors SNA recently discovered objects with a special kind of dynamical behavior between order and chaos in dissipative nonlinear systems under quasiperiodic driving A historical review of the discovery and study of SNA mathematical and physically motivated examples and a review of known experimental studies of SNA are presented The main focus is on the theoretical analysis of strange nonchaotic behavior by means of different tools of nonlinear dynamics and statistical physics bifurcation analysis Lyapunov exponents correlations and spectra renormalization group The relations of the subject to other fields of physics such as quantum chaos and solid state physics are also discussed

Bifurcation Theory and Applications Tian Ma,Shouhong Wang,2005 This book covers comprehensive bifurcation theory and its applications to dynamical systems and partial differential equations PDEs from science and engineering including in particular PDEs from physics chemistry biology and hydrodynamics The book first introduces bifurcation theories recently developed by the authors on steady state

bifurcation for a class of nonlinear problems with even order nondegenerate nonlinearities regardless of the multiplicity of the eigenvalues and on attractor bifurcations for nonlinear evolution equations a new notion of bifurcation With this new notion of bifurcation many longstanding bifurcation problems in science and engineering are becoming accessible and are treated in the second part of the book In particular applications are covered for a variety of PDEs from science and engineering including the Kuramoto-Okamoto-Sivashinsky equation the Cahn-Hilliard equation the Ginzburg-Landau equation reaction diffusion equations in biology and chemistry the Benard convection problem and the Taylor problem The applications provide on the one hand general recipes for other applications of the theory addressed in this book and on the other full classifications of the bifurcated attractor and the global attractor as the control parameters cross certain critical values dictated usually by the eigenvalues of the linearized problems It is expected that the book will greatly advance the study of nonlinear dynamics for many problems in science and engineering

New Methods for Chaotic Dynamics

Nikola Aleksandrovich Magnitskiy, Sergey Vasilevich Sidorov, 2006 An improved realization of mixed mode chaotic circuit which has both autonomous and nonautonomous chaotic dynamics is proposed Central to this study is inductorless realization of mixed mode chaotic circuit using FTFN based inductance simulator FTFN based topology used in this realization enables the simulation of ideal floating and grounded inductance This modification provides an alternative solution to the integration problem of not only mixed mode chaotic circuit but also other chaotic circuits in the literature using CMOS VLSI technologies In addition to this major improvement CFOA based nonlinear resistor was used in the new realization of mixed mode chaotic circuit The usage of CFOA based nonlinear resistor in the circuit's structure reduces the component count and provides buffered and isolated output Publisher's website

Advanced Topics on Cellular

Self-organizing Nets and Chaotic Nonlinear Dynamics to Model and Control Complex Systems Riccardo Caponetto, Luigi Fortuna, Mattia Frasca, 2008 This book focuses on the research topics investigated during the three year research project funded by the Italian Ministero dell'Istruzione dell'Università e della Ricerca MIUR Ministry of Education University and Research under the FIRB project RBNE01CW3M With the aim of introducing newer perspectives of the research on complexity the final results of the project are presented after a general introduction to the subject The book is intended to provide researchers PhD students and people involved in research projects in companies with the basic fundamentals of complex systems and the advanced project results recently obtained

Control of Homoclinic Chaos by Weak Periodic Perturbations Ricardo Chacón, 2005 This monograph presents a reasonably rigorous theory of a highly relevant chaos control method suppression enhancement of chaos by weak periodic excitations in low dimensional dissipative and non autonomous systems The theory provides analytical estimates of the ranges of parameters of the chaos controlling excitation for suppression enhancement of the initial chaos The important applications of the theory presented in the book include 1 control of chaotic escape from a potential well 2 suppression of chaos in a driven Josephson junction 3 control of chaotic

solitons in Frenkel Kontorova chains 4 control of chaotic breather dynamics in perturbed sine Gordon equations 5 control of chaotic charged particles in electrostatic wave packets *Equations Of Phase-locked Loops: Dynamics On Circle, Torus And Cylinder* Jacek Kudrewicz, Stefan Wasowicz, 2007-08-23 Phase Locked Loops PLLs are electronic systems that can be used as a synchronized oscillator a driver or multiplier of frequency a modulator or demodulator and as an amplifier of phase modulated signals This book updates the methods used in the analysis of PLLs by drawing on the results obtained in the last 40 years Many are published for the first time in book form Nonlinear and deterministic mathematical models of continuous time and discrete time PLLs are considered and their basic properties are given in the form of theorems with rigorous proofs The book exhibits very beautiful dynamics and shows various physical phenomena observed in synchronized oscillators described by complete not averaged equations of PLLs Specially selected mathematical tools are used the theory of differential equations on a torus the phase plane portraits on a cylinder a perturbation theory Melnikov's theorem on heteroclinic trajectories integral manifolds iterations of one dimensional maps of a circle and two dimensional maps of a cylinder Using these tools the properties of PLLs in particular the regions of synchronization are described Emphasis is on bifurcations of various types of periodic and chaotic oscillations Strange attractors in the dynamics of PLLs are considered such as those discovered by Rossler Henon Lorenz May Chua and others **Information Processing in Cells and Tissues** Michael Lones, Andy Tyrrell, Stephen Smith, Gary Fogel, 2015-09-02 This book constitutes the proceedings of the 10th International Conference on Information Processing in Cells and Tissues IPCAT 2015 held in San Diego CA USA in September 2015 The 19 papers presented in this volume were carefully reviewed and selected from 22 submissions They were organized in topical sections named biochemical information processing collective and distributed behavior patterning and rhythm generation biochemical regulatory networks metabolomics and phenotypes and neural modelling and neural networks

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