

CONTENTS

Preface	v
Gallery of Attractors from Chua's Oscillator	xv
1. PROLOGUE	
Strange attractors and dynamical models <i>L. P. Shil'nikov</i>	3
A CMOS monolithic Chua's circuit <i>M. Delgado-Restituto and A. Rodríguez-Vázquez</i>	13
Dynamics of the Lorenz equation and Chua's equation: A tutorial <i>Lj. Kocarev and T. Roska</i>	25
2. BIFURCATION PHENOMENA	
Introduction to experimental chaos using Chua's circuit <i>R. N. Madan and C. W. Wu</i>	59
The theory of confinors in Chua's circuit: Accurate analysis of bifurcations and attractors <i>R. Lozi and S. Ushiki</i>	90
Experimental observation of antimonotonicity in Chua's circuit <i>Lj. Kocarev, K. S. Halle, K. Eckert, and L. O. Chua</i>	137
On periodic orbits and homoclinic bifurcations in Chua's circuit with a smooth nonlinearity <i>A. I. Khibnik, D. Roose, and L. O. Chua</i>	145
Chua's oscillator: A zoo of attractors <i>P. Dergeel</i>	179
Characterisation of chaos in Chua's oscillator in terms of unstable periodic orbits <i>M. J. Ogorzalek and Z. Galias</i>	230
Boundary surfaces and basin bifurcations in Chua's circuit <i>L. Pivka and V. Špány</i>	249
3. RESONANCE, SYNCHRONIZATION, AND WAVES	
Stochastic resonance in Chua's circuit <i>V. S. Anishchenko, M. A. Safonova, and L. O. Chua</i>	281

Signal amplification via chaos: Experimental evidence <i>K. S. Halle, L. O. Chua, V. S. Anishchenko, and M. A. Safonova</i>	290
Chaos synchronization in Chua's circuit <i>L. O. Chua, M. Itoh, Lj. Kocarev, and K. Eckert</i>	309
On chaotic synchronization in a linear array of Chua's circuits <i>V. N. Belykh, N. N. Verichev, Lj. Kocarev, and L. O. Chua</i>	325
Traveling wave front and its failure in a one-dimensional array of Chua's circuit <i>V. Perez-Munuzuri, V. Perez-Villar, and L. O. Chua</i>	336
Spatial disorder and wave fronts in a chain of coupled Chua's circuits <i>V. I. Nekorkin and L. O. Chua</i>	351
4. APPLICATIONS OF CHUA'S CIRCUIT	
Experimental demonstration of secure communications via chaotic synchronization <i>Lj. Kocarev, K. S. Halle, K. Eckert, L. O. Chua, and U. Parlitz</i>	371
Spread spectrum communication through modulation of chaos in Chua's circuit <i>K. S. Halle, C. W. Wu, M. Itoh, and L. O. Chua</i>	379
Transmission of digital signals by chaotic synchronization <i>U. Parlitz, L. O. Chua, Lj. Kocarev, K. S. Halle, and A. Shang</i>	395
Bifurcation analysis of Chua's circuit with applications for low-level visual sensing <i>E. J. Altman</i>	404
Sound and music from Chua's circuit <i>X. Rodet</i>	434
5. CONTROLLING CHAOS	
Controlling chaos in Chua's circuit <i>G. A. Johnson, T. E. Tigner, and E. R. Hunt</i>	449
Maintaining stability in Chua's circuit driven into regions of oscillation and chaos <i>G. A. Johnson and E. R. Hunt</i>	458
Controlling of chaos in the driven Chua's circuit <i>K. Murali and M. Lakshmanan</i>	463
Targeting unstable stationary states of Chua's circuit <i>T. Kapitaniak</i>	476

Controlling Chua's circuit <i>G. Chen and X. Dong</i>	481
Control of Chua's circuit <i>T. T. Hartley and F. Mossayebi</i>	492
Distortion control of chaotic systems: The Chua's circuit <i>R. Genesio and A. Tesi</i>	514
A unified method of control and synchronization of chaos <i>Lj. Kocarev, A. Shang, and L. O. Chua</i>	535
6. ONE-DIMENSIONAL POINCARÉ MAPS FROM CHUA'S CIRCUIT	
Applications of 1-D map from Chua's circuit: A pictorial guide <i>M. Genot</i>	545
Experimental analysis of 1-D maps from Chua's circuit <i>N. F. Rul'kov and A. R. Volkovskii</i>	580
Two-parameter study of transition to chaos in Chua's circuit: Renormalization group, universality and scaling <i>A. P. Kuznetsov, S. P. Kuznetsov, I. R. Sataev, and L. O. Chua</i>	591
Chua's circuit with a discontinuous nonlinearity <i>A. I. Mahla and Á. G. Badan Palhares</i>	622
From the Chua circuit to the generalized Chua map <i>R. Brown</i>	629
Unimodal interval maps obtained from the modified Chua equations <i>M. Misiurewicz</i>	651
7. STRANGE ATTRACTORS	
The double hook attractor in Chua's circuit: Some analytical results <i>C. P. Silva</i>	671
Chua's circuit as a slow-fast autonomous dynamical system <i>B. Rossetto</i>	711
Global stability and instability of canonical Chua's circuits <i>G. A. Leonov, D. V. Ponomarenko, V. B. Smirnova, and L. O. Chua</i>	725
A new type of strange attractor related to the Chua's circuit <i>V. N. Belykh and L. O. Chua</i>	740
Enigma of the double-scroll Chua's attractor <i>V. S. Afraimovich and L. O. Chua</i>	754

8. PIECEWISE-LINEAR ANALYSIS

- Digital signal processor-based investigation of Chua's circuit family 769
M. P. Kennedy, C. W. Wu, S. Pau, and J. Tow
- Piecewise-linear analysis for Chua's circuit family, including the
 computation of Lyapunov exponents 793
M. Biey, S. Chialina, M. Hasler, and A. Premoli
- Modelling and simulation of Chua's circuit 805
E. Lindberg
- Maximum dynamic range of bifurcations of Chua's circuit 821
A. A. A. Nasser, E. E. Hosny, and M. I. Sobhy
- The effects of symmetry breaking in Chua's circuit and related
 piecewise-linear dynamical systems 832
C. Kahlert
- Transformations of circuits belonging to Chua's circuit family into
 nonlinear feedback loops made of passive RC-filter and active
 memoryless nonlinearity 860
F. Böhme and W. Schwarz

9. TIME SERIES ANALYSIS

- Chaos-chaos intermittency and $1/f$ noise in Chua's circuit 879
V. S. Anishchenko, A. B. Neiman, and L. O. Chua
- Bispectral analysis of Chua's circuit 892
S. Elgar and M. P. Kennedy
- Reconstructing the dynamics of Chua's circuit 908
J. Glover and A. Mees
- Lyapunov exponents from Chua's circuit 922
U. Parlitz

10. GENERALIZATIONS OF CHUA'S CIRCUITc

- An autonomous chaotic cellular neural network and Chua's circuit 941
F. Zou and J. A. Nossek
- Chaotic cellular neural networks made of Chua's circuits 952
C. Güzeliz
- Dynamics of Chua's circuit in a Banach space 962
C. M. Blázquez and E. Tuma
- High-frequency oscillations from Chua's circuit 976
K. A. Lukin

Cycles of chaotic intervals in a time-delayed Chua's circuit <i>Yu. L. Maistrenko, V. L. Maistrenko, and L. O. Chua</i>	993
Dry turbulence from a time-delayed Chua's circuit <i>A. N. Sharkovsky, Yu. Maistrenko, P. Deregél, and L. O. Chua</i>	1018
Adventures in Bifurcations and Chaos	1042