

2011 Fourth International Workshop on Chaos-Fractals Theories and Applications

(IWCFTA 2011)

**Hangzhou, China
19 – 22 October 2011**



**IEEE Catalog Number: CFP1123I-PRT
ISBN: 978-1-4577-1798-7**

2011 Fourth International Workshop on Chaos-Fractals Theories and Applications

IWCFTA 2011

Table of Contents

Welcome Message from the Workshop Co-Chairs	xii
IWCFTA2011 Organizing and Program Committees.....	xiii
Reviewers	xv

Chaotic Dynamics

Effect of Constant External Force on Dynamics of Spiral Waves	3
<i>Guoyong Yuan</i>	
Hopf Bifurcation in Genesio System with Delayed Feedback	8
<i>Junbiao Guan and Fangyue Chen</i>	
Local Manifolds and Closed Orbits of the Conjugate Lorenz-Type System	13
<i>Yongjian Liu and Jingzhong Gan</i>	
A New 4D Four-Wing Hyperchaotic Smooth Autonomous System and Its Improved Form	18
<i>Chunlai Li, Zilong Tang, and Simin Yu</i>	
Bifurcation of Limit Cycles of a Perturbed Integrable Non-Hamiltonian System	22
<i>Xiao-Chun Hong and Benshu Tan</i>	
An Eight-Wing Chaotic Attractor Generated from a Qi Four-Wing Chaotic System	27
<i>Guoyuan Qi</i>	
Dynamics Analysis of the Stochastic Lorenz System	32
<i>Xinshu Lin, Yongguang Yu, and Hu Wang</i>	
The Stability and Chaos Analysis of the Lorenz-84 Atmosphere Model with Seasonal Forcing	37
<i>Yu Song, Yongguang Yu, and Hu Wang</i>	
Hopf Bifurcation Analysis and Circuit Simulation of a New Chen Hyper-Chaotic System	42
<i>Enzeng Dong, Zhiling Lin, Zaiping Chen, and Zengqiang Chen</i>	

The FPGA Implementation of Hyperchaotic System Based upon VHDL Design	47
<i>Zeng-qiang Chen, Guo-qing Liang, and Ji-gang Tong</i>	
Analysis and Circuit Design of a Fractional Four-Wing Chaotic Attractor	52
<i>Hongyan Jia, Wei Xue, Zengqiang Chen, and Qiang Li</i>	
A New Memristor Based Chaotic Circuit	57
<i>Weiling Wang, Guangyi Wang, and De Tan</i>	
Lie Symmetry Analysis and Exact Solutions for the Coupled Kuramoto-Sivashinsky Equations	61
<i>Fang Yan, Cuncai Hua, Haihong Liu, and Zengrong Liu</i>	
A Variable Structure Chaos System Research and Its Realization	66
<i>Chengliang Zhang, Guangyi Wang, and Aixue Qi</i>	
Computer Assisted Rigorous Proof of Chaos in the Ikeda Map	70
<i>Kaihua Wang, Congping Lin, and Xinchu Fu</i>	
Rank One Chaos in Periodically-Kicked Hénon Map	75
<i>Chen Yan, Cui Wu, and Fengjuan Chen</i>	
Si'lnikov Heterclinic Orbits of a New Chaos	78
<i>Zhonglin Wang, Baoguo Shi, and Zengqiang Chen</i>	
Symmetrical Multi-petal Chaotic Attractors in a 3D Autonomous System with Only One Stable Equilibrium	82
<i>Xiong Wang and Guanrong Chen</i>	
Complex Systems	
Bifurcation and Chaos of a Three Species Food Chain System with Time Delay	89
<i>Juan Fang and Yiping Lin</i>	
Bifurcations and Chaos in a Discrete Investment Competition Game Model	94
<i>Weizhuo Ji</i>	
On Chaos in Cournot Duopoly Model	98
<i>Zhenhua Jiao, Liping Yan, and Conghao Jin</i>	
Chaotic Analysis of a Cournot Model with the Behavior Rule of Short-Sighted Eyes	102
<i>Qiuling Huang, Yuming Shi, and Zongcheng Li</i>	
Analysis of a Three Species Ratio-Dependent Food Chain System with Time Delayed Harvesting	107
<i>Junwei Yan and Yiping Lin</i>	
The Application of Stochastic Resonance Driven by Two-Frequency Signals for Detecting Incipient Fault of Rotor System	112
<i>Meili Zhang and Min Lin</i>	
Effect of Two-Part Inhomogeneity on Spiral Wave Dynamics in Excitable Media	116
<i>Huan Zhang, Guoyong Yuan, Hongling Fan, and Shaoying Chen</i>	

On the Solitary Wave and Periodic Wave Solutions of the Nonlinear Drift-Wave Equation Arising from Magnetized Plasmas	121
<i>Cun-cai Hua</i>	
The Analytical Solution of the Average Distance for Delayed Deterministic Recursive Trees	125
<i>Ran Wang, Jindong Shen, and Weigang Sun</i>	
The Dynamic Complexity of an Apparent Competition Community Ecological Model with the Beddington-DeAngelis Functional Response	130
<i>Hengguo Yu and Min Zhao</i>	
A Scale-Free Small-World Network from Durer Pentagons	135
<i>Yuan-yuan Sun, Kai-ning Hou, and Xing-yuan Wang</i>	
Topological Conjugacy Classification of Two-Dimensional Cellular Automata	139
<i>Weifeng Jin, Fangyue Chen, and Chunlan Yang</i>	
A Chaotic Subsystem of Hyper Bernoulli Shift Rule 41	143
<i>Yunfeng Bian, Fangyue Chen, Jing Chen, and Wei Chen</i>	
Catastrophic Bifurcation in Three-Phase Voltage-Source Converters	147
<i>Meng Huang, Siu Chung Wong, Chi K. Tse, and Xinbo Ruan</i>	
A New Immunization Strategy for Complex Network	152
<i>Hua Chai, Yuan-yuan Liu, Sen Lin, Hai Yu, and Zhi-liang Zhu</i>	
Future Design of Channel Codes: A Complex Network Perspective	156
<i>Francis C. M. Lau, Chi K. Tse, and Zhiliang Zhu</i>	
Optimal Investment Portfolio Model with Degree Risk in Complex Stock Network	161
<i>Sen Qin, Xufeng Chen, and Weigang Sun</i>	
 Chaos-Based Cryptography and Secure Communications	
Study Chaotic Sequences by Unary Quadratic Nonlinear Transformation	169
<i>Hong Chen, Meizhou Gao, and Hongpeng Zhang</i>	
The Frequency Truncation Method Research of Lorenz-Based Chaotic Masking Secure Communication	174
<i>Jing Pan and Qun Ding</i>	
An Image Encryption Scheme Based on Modified Logistic Map	179
<i>Yue Sun and Guangyi Wang</i>	
ARM Realization of Storage Device Encryption Based on Chaos and AES Algorithm	183
<i>Chunlei Wang, Guangyi Wang, Yue Sun, and Wei Chen</i>	
Scrambling Chaotic Image Encryption Algorithm Based on Contourlet	188
<i>Can He, Aiping Jiang, Jia Yu, and Baoxiang Du</i>	
One-Way Hash Function Construction Based on Chaotic Coupled Map Network	193
<i>Hai Yu, Ya-feng Lu, Xue Yang, and Zhi-liang Zhu</i>	

A New Chaotic Encryption Scheme Based on Enigma Machine	198
<i>Zhi-liang Zhu, Chao Bu, Hui Li, and Hai Yu</i>	
A Robust Wide Synchronous Digital Chaotic Communication Scheme in Shallow Water Channel	203
<i>Jian-Ping Yue, Hong-Wei Li, Ji-Ling Zhang, Peng-Tao Hu, Min Shi, and Bai-Feng Liu</i>	
An Enhanced PMA-DCSK Scheme and Performance Evaluation	208
<i>Jingping Song, Zhiliang Zhu, Kun Cui, and Hai Yu</i>	
A Chaotic Image Encryption Scheme Based on Magic Cube Transformation	214
<i>Zhi-liang Zhu, Chong Wang, Hua Chai, and Hai Yu</i>	

Chaos Synchronization

Modified Projective Synchronization of Different-Order Chaotic Systems with Uncertain Parameters	221
<i>Wenwen Wang and Ranchao Wu</i>	
Projective Synchronization between the Fractional-Order Simplified Lorenz Chaotic Systems	225
<i>Kehui Sun, Xia Wang, Xuan Liu, and Congxu Zhu</i>	
Control and Synchronization of Chaotic Systems Using Fuzzy Feedback Linearization	230
<i>Azita Azarfar, Hossein Gholizade-Narm, and Heydar Toosian Shandiz</i>	
Two Novel Synchronization Criteria for Unified Chaotic Systems via LMI	235
<i>Kuibiao Deng, Simin Yu, and Chaoxia Zhang</i>	
The Synchronization of Fractional Order Chaotic Systems with Different Dimensions through Sliding Mode Control	239
<i>Jing Bai and Yongguang Yu</i>	
Synchronization of Perturbed Fractional-Order Chaotic System Using Modified Adaptive Controller	244
<i>Ruoxun Zhang, Shiping Yang, Chao Chen, and Cao Hefei</i>	
Utilizing Symmetries in Chaotic Synchronization	249
<i>Zhiliang Wang, Dongsheng Yang, and Mo Zhao</i>	
Function Projective Synchronization of Chaotic Fractional Order Systems with Different Dimensions	254
<i>Sha Wang and Yongguang Yu</i>	
Modified Function Projective Synchronization of Two Different Chaotic Systems Using Active Sliding Mode Control	259
<i>Jingui Liu</i>	
Synchronization and Parameters Identification of Incommensurate Fractional-Order Chaotic System Using Adaptive Sliding Mode Approach	263
<i>Ruoxun Zhang and Shiping Yang</i>	

Chaos Synchronization of Electro-Mechanical Gyrostat Systems via Time-Delay Feedback Control	268
<i>Lifang Cai, Jin Zhou, and Hua Zhang</i>	
Synchronization of the Fractional-Order Hyperchaotic Lorenz System	273
<i>Weibo Jiang and Tiedong Ma</i>	
Global Synchronization of a Hyperchaotic System with Four-Wing	278
<i>Yuxia Li, Lei Wang, and Xia Huang</i>	
Modified Impulsive Synchronization of Fractional Order Hyperchaotic Chen Systems	283
<i>Tiedong Ma, Weibo Jiang, and Jie Fu</i>	
 Chaos-Based Control and Optimization	
Predicting the End Breakage Rates of Ring Spinning Polyester Cotton Yarn	291
<i>Zhao Bo</i>	
Controlling Chaos in Single-Machine-Infinite Bus Power System by Adaptive Passive Method	295
<i>Du-Qu Wei and Ying-Hua Qin</i>	
SAS Autofocus Based on Phase Gradient Autofocus	298
<i>Sanwen Zhu, Jianping Yue, and Weitao Jiang</i>	
Stochastic Energetic Resonance in Detecting Vortex Shedding Frequency	302
<i>Ying Meng, Min Lin, and Yong Mei Huang</i>	
Chaos Control and Synchronization of a Three-Mode System of Couette-Taylor Flow	306
<i>Heyuan Wang and Xiaoli Zhang</i>	
Blind Separation of Chaotic Signal Based on Random Set Model	311
<i>Bo Hu and Zhi-jin Zhao</i>	
Adaptive Control of 2D Discrete-Time Ushiki System with Uncertain Parameters or Not	315
<i>Ping Yang, Liying Guo, Siqing Deng, and Yin Li</i>	
The Research of Weak Fault Signal Detection Based on the Duffing Oscillator Coupled Synchronization	319
<i>Ning Li, Le Li, Dongsheng Yang, Yan Zhao, and Yi Yang</i>	
Detection of Underwater Acoustic Signal from Ship Noise Based on WPT Method	324
<i>Sheng Chen and HongHua Zhang</i>	
Chaotic Oscillator Based on Memristor and Its Circuit Implementation	328
<i>Aixue Qi and Guangyi Wang</i>	
Selection of Reconstruction Variables and Parameters in the Phase Space Reconstruction on Genetic Algorithm	332
<i>Hui Tao, Xiao-Ping Ma, and Mei-Ying Qiao</i>	

Identification Method of Correlation Dimension Scaleless Region Based on Fuzzy C-Means Clustering	337
<i>Mei-ying Qiao, Hui Tao, and Xiao-ping Ma</i>	
Chaos Synchronization of Coupled Ring and Linear Arrays System Using Adaptive Control	342
<i>Li-Ming Wang and Xiao-Jian Li</i>	
Coordinated Control of Multi-agent Systems with Bounded Control Inputs and Preserved Network Connectivity	347
<i>Guangsu Sun</i>	
Coordinated Control of Multi-agent Systems with Coupling Delay	352
<i>Guangsu Sun</i>	
Pinning Control of Fractional-order Chaotic Network	357
<i>Jincheng Wang and Jianping Cai</i>	
 Fractals Theory and Applications	
Spectrum Sensing for Cognitive Ultra-wideband Based on Fractal Dimensions	363
<i>Xiaobo Chen, Hong Chen, and Yin Chen</i>	
Fractional Behavior in Element Grade Series: An Application of Detrended Fluctuation Analysis	368
<i>Li Wan, Jianxia Wang, and Jiaoxiu Ling</i>	
Fractal Features Analysis of Green Spaces on Rural-Urban Fringe in Guangzhou, China	372
<i>Zhaoxian Gong and Li Wan</i>	
A Research for Fractal and Chaotic Structure in Chinese Soybean Futures Market	376
<i>Xudong Li</i>	
Image Segmentation by Co-existing Strange Attractor Networks	381
<i>Yunzhong Song and Yanyan Li</i>	
Generation and Realization of Digital Chaotic Key Sequence Based on K-L Transform	385
<i>Baoxiang Du, Xiaoli Geng, and Qun Ding</i>	
A Segmentation Method of Smoke in Forest-Fire Image Based on FBM and Region Growing	390
<i>Xialli Wang, Aiping Jiang, and Yingli Wang</i>	
A Revised DLA Model for Simulation of Frost Formation and Growth	394
<i>Jianping Yu, Shuping Chen, and Shuting Yao</i>	
Generation of Multi-scroll Chaotic Attractors from Fractal and Multi-fractal Processes	398
<i>Kais Bouallegue</i>	
Study of Surface Topography of Ni-Co Coating by Brush Plating Analysis Based on the Fractal Dimension of Gray Images	403
<i>Yucui Dong, Tianyuan Jiang, Ling Zhang, Lianghai Yi, Min Lin, and Hongtao Shi</i>	

Study on Fractal Theory in Identifying Soil Fabric in Civil Engineering	407
<i>Jiangdong Cai and Guoqing Zhou</i>	
On Noise of Julia Sets in Coupled Map Lattice	412
<i>Ping Liu, Shutang Liu, and Xiang Li</i>	
Comparative Research on the Industry Indices of Chinese Stock Market Based on Multifractal and Neural Network	416
<i>Lin Zhang</i>	
A New Image Compression Method Based on Fractal Equations	421
<i>Glauco dos Santos Reis and Pedro P.B. de Oliveira</i>	
Author Index	427