Proceedings of
the 2007 International Symposium on
Nonlinear Theory and its Applications (NOLTA’07)

Vancouver, September 16–19, 2007

Research Society of Nonlinear Theory and its Applications, IEICE
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2007 International Symposium on Nonlinear Theory and its Applications

Simon Fraser University at Harbour Centre
Vancouver, Canada
September 16–19, 2007

Organizer:
Research Society of Nonlinear Theory and its Applications, IEICE

In Cooperation with:
Simon Fraser University
SCAT
Technical Group on Nonlinear Problems, IEICE
Technical Group on Circuits and Systems, IEICE
IEEE Circuits and Systems Society
IEEE Vancouver Section
Greetings from the General Co-Chairs

It is with great pleasure that we invite you to the International Symposium on Nonlinear Theory and Applications, NOLTA 2007. The Symposium is organized by the Research Society of Nonlinear Theory and its Applications of the Institute of Electronics, Information and Communication Engineers (IEICE). It is co-sponsored by the Technical Groups on Nonlinear Problems and on Circuits and Systems of the Engineering Sciences Society (IEICE), the IEEE Circuits and Systems Society, the IEEE Vancouver Section, and Simon Fraser University.

It is a great honor to host NOLTA 2007 in Vancouver, British Columbia, Canada. The first NOLTA Symposium was held in 1990 in Japan. It became an international event three years later. Since its foundation, NOLTA Symposia have been held in Japan, the USA, Switzerland, Germany, China, Belgium, and Italy. Vancouver, arguably one of the most beautiful cities in the world, is graced with modern urban architecture and beautiful lush parks, far-reaching views of the Pacific Ocean, and breathtaking views of the Coastal Mountain range surrounding the city. Vancouver is a sister city of Yokohama-shi (Kanagawa-ken). The “Playground of the Gods”, majestic wooden sculptures carved by Nuburi Toko, an aboriginal of Hokkaido, grace the panoramic slopes of Burnaby Mountain Park that on a clear, sunny day offer spectacular scenes of Burrard Inlet, Indian Arm, the North Shore Mountains, Stanley Park, and the city of Vancouver and beyond.

The highlight of the Symposium is the NOLTA 2007 Technical Program consisting of special sessions, work-in-progress sessions, and regular papers. We would like to offer special thanks to the Technical Program Co-Chairs, Hisato Fujisaka (Hiroshima City University) and Leonid Goldgeisser (Synopsys) for arranging an excellent technical program. We thank the Special Sessions Co-Chairs, the Technical Program Committee Members, and the reviewers for their dedicated service. We would also like to thank the keynote speakers and session co-chairs for their fine contributions to the technical program. Finally, our sincere thanks also go to the authors for their excellent contributions and participation in NOLTA 2007.

The Symposium would not be possible without the endless help and dedication of the members of the Symposium Organization Committee, including the Publications Co-Chairs, Finance Chair, Publicity Co-Chairs, Technical Program Secretary, System Administration, and, above all, the General Secretary, Yoshifumi Nishio (Tokushima University).

The traditional Welcome Reception will be held on Sunday, September 16, 2007 in the Welcome Hall of the Simon Fraser University Segal School of Business. The symposium banquet will be held on Tuesday, September 18, 2007 in the unique setting of the Vancouver Aquarium, host to 60,000 amazing creatures including beluga whales, seals, otters, and sharks. We also hope to offer a Farewell Reception during the evening of Wednesday, September 19, 2007.

We sincerely hope that you will find the NOLTA 2007 Technical Program stimulating, interactions with the participants productive, and your stay in Vancouver enjoyable.
Welcome Note from the Technical Program Co-Chairs

On behalf of the Technical Program Committee, it is our pleasure to welcome you to NOLTA 2007 to be held in beautiful British Columbia.

The symposium technical program covers many major and emerging areas in the Nonlinear Circuit Theory and Electronic Circuits. The Technical Program Committee selected 140 papers to be presented in 35 technical sessions including 11 special sessions.

This year we tried to minimize the number of parallel sessions with similar interests in an attempt to achieve a better audience for all sessions. Thus we have only 4 parallel sessions on Monday and Wednesday and 5 parallel sessions on Tuesday. Mini-Workshops on Self-Validating Numerics will be offered on Monday.

The technical program has been prepared by NOLTA 2007 Technical Program Committee consisting of 49 reviewers and review committee members. We would like to thank our reviewers and review committee members, Special Sessions and Workshop organizers for their focus on high quality, timeliness and hard work. Finally we would like to expresses our appreciation to the authors for their quality contributions.

Thank you very much for coming. Enjoy the technical and social programs and have a great time!

Leonid Goldgeisser  Hisato Fujisaka
Technical Program Co-Chairs, NOLTA 2007
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Toshimichi Saito (Hosei Univ.)  Yuichi Tanji (Kagawa Univ.)
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- Applications of Nonlinear Theory to Infectious Disease Dynamics
  Peter Borwein (Simon Fraser University)
  Alexander R. Rutherford (Simon Fraser University)
  Krisztina Vasarhelyi (Simon Fraser University)

- Complex Systems and Communication Networks
  Riccardo Rovatti (University of Bologna)
  Gianluca Setti (University of Ferrara)

- Consistency and Synchronization I, II
  Shin-itiro Goto (Lancaster University)
  Atsuhi Uchida (Takushoku University)

- Mobile Communication Systems
  Hiroyuki Yashima (Tokyo University of Science)

- Nano-Actuators and Applications: Theory, experiments, modeling
  Vakhtang, Putkaradze (Colorado State University)
  Takashi Hikihara (Kyoto University)

- Nonlinear Speech and Image Processing
  Shimamura Tetsuya (Saitama University)

- Numerical Computation with Result Verification I, II, III
  Shin’ichi Oishi (Waseda University)
  Michael Plum (Karlsruhe University)
  Siegfried M. Rump (Hamburg University of Technology)

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N. Takahashi (Kyushu Univ.)  R. Takahashi (RIKEN)
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A. Uchida (Takushoku Univ.)  T. Ushio (Osaka Univ.)
Y. Uwate (Tokushima Univ.)  M. Wada (Konan Univ.)
H. Yashima (Tokyo Univ. of Science)  K. Yoshimura (NTT Corp.)
Symposium Information

Symposium Venue
Simon Fraser University at Harbour Centre
515 West Hastings Street, Vancouver, BC V68 5K3
TEL: 778-782-5800
FAX: 778-782-7621

Figure 1: Map around the symposium venue.
Figure 2: Floor plan.

Social Events

- **September 16th**
  - **Registration**: 4:00PM–6:00PM
    Main Concourse, SFU at Harbour Centre. 515 Hastings Street.

  - **Welcome reception**: 6:00PM–9:00PM
    Rooms 1200/1500, Segal Graduate School of Business. 500 Granville Street (see Fig. 1)

- **September 18th**
  **Banquet at the Aquarium**: 8:00PM–10:30PM
  Vancouver Aquarium, 845 Avison Way, Vancouver.
  Limousine to the aquarium will depart at **6:15PM** from the symposium venue.
### Session at a Glance

#### September 16, 2007 (Sunday)
16:00–18:00 Registration  18:00–21:00 Welcome reception

#### September 17, 2007 (Monday)

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<td><strong>17PM1-B: Cellular Neural Networks I</strong>, Page xvii</td>
<td>**17PM1-C: Communication Networks Page xviii</td>
<td><strong>17PM1-D: Special Session; Consistency and Synchronization I-1</strong>, Page xviii</td>
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<td><strong>17PM2-B: Cellular Neural Networks II</strong>, Page xix</td>
<td>**17PM2-C: Special Session; Mobile Communication Systems Page xx</td>
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<td>18AM2-C: Sequences and Communications II</td>
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<td>18PM2-C: Special Session; Complex Systems and Communication Networks</td>
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<td>19AM1-C: Signal Processing Page xxx</td>
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Technical Program

17AM1-B: Plenary Session I

Date: September 17 (Mon) 11:30-12:30
Room: B (Segal)
Chaired by: Ljiljana Trajković (Simon Fraser University)

17AM1-B-1 Numerical Solutions of Non-Linear Integral-Differential Equations for Ferromagnetism
Anthony Arrott (Simon Fraser Univ.)

17PM1-A: Electronic Circuits I

Date: September 17 (Mon) 14:00-15:00
Room: A (1520)
Chaired by: Hiroo Sekiya (Chiba University)

17PM1-A-1 An Ultra Low-Power High-Speed Rail-to-Rail Buffer Amplifier for LCD Source Drivers
Pan Jun (Waseda Univ.), Liang Zheng (Waseda Univ.), Huang Wei-Lun (Waseda Univ.), Inoue Yasuaki (Waseda Univ.)

17PM1-A-2 Improvement to the Condition for Oscillation of Cross-coupled Sinusoidal Oscillators
Ahmed Elwakil (Univ. of Sharjah), Khaled Salama (Rensselaer Polytechnic Institute)

17PM1-A-3 [WIP] A Neuron Circuit Model with Smooth Nonlinear Output Function
Yosuke Yamashita (Anan National College of Technology), Yuichi Nakamura (Anan National College of Technology)

17PM1-B: Cellular Neural Networks I

Date: September 17 (Mon) 14:00-15:00
Room: B (Segal)
Chaired by: Hikaru Mizutani (Shonan Institute of Technology)

17PM1-B-1 An Adaptive Cellular Nonlinear Network and its Application
A Stability Condition for a Simple Type of Two-Dimensional Discrete-time Cellular Neural Networks

Hajime Hara (Hiroshima Inst. of Tech.), Tomotaka Ogura (Hiroshima Inst. of Tech.), Toshio Asano (Hiroshima Inst. of Tech.), Tetsuo Nishi (Waseda Univ.), Norikazu Takahashi (Kyushu Univ.)

[WIP] Wave Phenomena in Cellular Neural Networks Using Two Kinds of Template Sets

Junji Fujii (Shikoku Univ.), Yasuteru Hosokawa (Shikoku Univ.), Yoshifumi Nishio (Tokushima Univ.)

17PM1-C: Communication Networks

Date: September 17 (Mon) 14:00-15:00
Room: C (1425)
Chaired by: Michael Small (Hong Kong Polytechnic University)

Modeling of TCP/IP Congestion Control Mechanism with Queueing

Stefanos Politis (Univ. College Dublin), Paul Curran (Univ. College Dublin)

An Efficient Routing Strategy with Load-Balancing for Complex Networks

Takayuki Kimura (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)

Trajectory Tracking Control for Video Streaming Application

Zitoune Lynda (IEF, Univ. Paris sud XI), Mounier Hugues (IEF, Univ. Paris sud XI), Vèque Véronique (IEF, Univ. Paris sud XI)

17PM1-D: Special Session; Consistency and Synchronization I-1

Date: September 17 (Mon) 14:00-15:00
Room: D (1600)
Chaired by: Kazuyuki Yoshimura (NTT Corporation)

Consistency in Driven Nonlinear Systems

Atsushi Uchida (Takushoku Univ.), Shigeru Yoshimori (Takushoku Univ.), Rajarshi Roy (Univ. of Maryland)

Consistency in Artificial Chaotic Spiking Neurons

Tomohiro Inagaki (Hosei Univ.), Hidehiro Nakano (Musashi Inst. Tech.), Toshimichi Saito (Hosei Univ.)
17PM1-D-3 Control of Spatiotemporal Intermittency by Parametric Resonance
Noriko Oikawa (Kyushu Univ.), Yoshiki Hidaka (Kyushu Univ.), Shoichi Kai (Kyushu Univ.)

17PM2-A: Electronic Circuits II
Date: September 17 (Mon) 15:20-16:40
Room: A (1520)
Chaired by: Keiji Konishi (Osaka Prefecture University)

17PM2-A-1 White Noise Generation with Chaos from Phase-Locked Loop Integrated Circuit Module
Tetsuro Endo (Meiji Univ.), Jun Yokota (Meiji Univ.)

17PM2-A-2 Superstable Phenomena of 1-D Map with a Trapping Window and its Application
Yusuke Matsuoka (Hosei Univ.), Toshimichi Saito (Hosei Univ.)

17PM2-A-3 An Analysis of Second-Order Sigma-Delta Modulator and its Application to AC Load Monitor
Keita Hayashi (Hiroshima City Univ.), Hisato Fujisaka (Hiroshima City Univ.), Takeshi Kamio (Hiroshima City Univ.), Kazuhisa Haeiwa (Hiroshima City Univ.)

17PM2-A-4 [WIP] A Circuit Design for Compact Sigma-Delta Domain Multiplier
Tsubasa Katao (Hiroshima City Univ.), Keita Hayashi (Hiroshima City Univ.), Hisato Fujisaka (Hiroshima City Univ.), Takeshi Kamio (Hiroshima City Univ.), Kazuhisa Haeiwa (Hiroshima City Univ.)

17PM2-B: Cellular Neural Networks II
Date: September 17 (Mon) 15:20-16:40
Room: B (Segal)
Chaired by: Heinz Koepppl (Swiss Federal Institute of Technology Lausanne)

17PM2-B-1 DT-CNN Based Resolution Enhancement of Images using Cycle Spinning
Takefumi Konishi (Tamagawa Univ.), Tsuyoshi Otake (Tamagawa Univ.), Hisashi Aomori (Sophia Univ.), Nobuaki Takahashi (IBM Japan), Mamoru Tanaka (Sophia Univ.)

17PM2-B-2 A Method of Edge Detection using Small World Cellular Neural Network
Masaru Nakano (Tokushima Univ.), Yoshifumi Nishio (Tokushima university)

17PM2-B-3 A Neural Network System to Adjust a Strain of Patterns
Hikaru Mizutani (Shonan Inst. of Tech.)
17PM2-C: Special Session; Mobile Communication Systems

Date: September 17 (Mon) 15:20-16:40
Room: C (1425)
Chaired by: Hiroyuki Yashima (Tokyo University of Science)

17PM2-C-1  Adaptive Transmission Power Control for MIMO Diversity Employing Polarization Diversity in OFDM Radio Access  
Tsutomu Ohno (Keio Univ.), Iwao Sasase (Keio Univ.)

17PM2-C-2  Reduction of Computational Complexity Using Interference Cancellation in Maximum Likelihood Receiver for SDM Systems  
Takahiko Saba (Chiba Institute of Technology), Jun Konishi (Chiba Institute of Technology)

17PM2-C-3  Frequency Offset Compensation Scheme Using Soft Interference Cancellation in Reverse Link of MIMO-OFDMA Systems  
Masaki Ogata (Chiba Institute of Technology), Takahiko Saba (Chiba Institute of Technology)

17PM2-C-4  Efficient Channel Estimation Scheme for Pulse-shaping OFDM Systems  
Bayarpurev Mongol (Nagoya Univ.), Takaya Yamazato (Nagoya Univ.), Masaaki Katayama (Nagoya Univ.)

17PM2-D: Special Session; Consistency and Synchronization I-2

Date: September 17 (Mon) 15:20-16:40
Room: D (1600)
Chaired by: Kazuyuki Yoshimura (NTT Corporation)

17PM2-D-1  Multiple Basins of Consistency in a Mackey-Glass Electronic Circuit Driven by Colored Noise  
Hoipang Yip (Takushoku Univ.), Satoshi Sano (Takushoku Univ.), Atsushi Uchida (Takushoku Univ.), Shigeru Yoshimori (Takushoku Univ.)

17PM2-D-2  The Analysis of Phase Coherence of An Ensemble of Uncoupled Limit-Cycle Oscillators via Averaging of a Jump-Diffusion Kolmogorov Equation  
Kensuke Arai (Kyoto Univ.), Hiroya Nakao (Kyoto Univ.)

17PM2-D-3  Nonresonant Entrainment between Detuned Oscillators Induced by Common External Noise  
Kazuyuki Yoshimura (NTT Communication Science Laboratories), Peter Davis (NTT Communication Science Laboratories), Atsushi Uchida (Takushoku university)
18AM1-A: Circuit and System Theory

Date: September 18 (Tue) 09:00-10:20
Room: A (1520)
Chaired by: Yasunori Endo (University of Tsukuba)

18AM1-A-1 A Fuzzy Estimation Theory for Available Operation of Extremely Complicated Large-Scale Network Systems  
Kazuo Horiuchi (Waseda Univ.)

18AM1-A-2 Formal Linearization for Time-Delay Nonlinear Systems using Chebyshev Expansion  
Kazuo Komatsu (Kumamoto National College of Technology), Hitoshi Takata (Kagoshima Univ.)

18AM1-A-3 Calculation and Formation of the Power Density Spectrum of Chaotically Clocked Continuous Discrete Systems  
Marcus Hellfeld (Technische Univ. Dresden), Wolfgang Schwarz (Technische Univ. Dresden)

18AM1-A-4 Sparse and Passive Reduced-Order Interconnect Modeling by Eigenspace Method  
Yuichi Tanji (Kagawa Univ.)

18AM1-B: Chaotic Neural Networks

Date: September 18 (Tue) 09:00-10:20
Room: B (Segal)
Chaired by: Kenya Jin’no (Kanto Gakuin University)

18AM1-B-1 A new Parameter Adjustment Approach for Solving Vehicle Routing Problem with Chaotic Neurodynamics  
Takashi Hoshino (Saitama Univ.), Takayuki Kimura (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)

18AM1-B-2 Relation between Recall Frequency of Stored Patterns and their Basin Size in Chaotic Neural Network  
Kazuki Hirozawa (Tokyo Univ. of Technology), Yuko Osana (Tokyo Univ. of Technology)

18AM1-B-3 An Associative Chaotic Neural Network with Gap-Junctions  
Masaharu Adachi (Tokyo Denki Univ.), Kazuyuki Aihara (The Univ. of Tokyo)

18AM1-C: Sequences and Communications I

Date: September 18 (Tue) 09:00-10:20
Room: C (1425)
Chaired by: Pascal Chargé (Toulouse University)
18AM1-C-1 On Generation of Maximal-Period Chaotic Sequences Obtained by Discretized Chaos Maps  
Daisaburo Yoshioka (Sojo Univ.), Akio Tsuneda (Kumamoto Univ.)

18AM1-C-2 A Deterministic Cellular Array Model of Reaction-Diffusion Systems for Parallel Generation of Pseudo-Random I.I.D. Sequences  
Shunsuke Soga (Hiroshima City Univ.), Hisato Fujisaka (Hiroshima City Univ.), Takeshi Kamio (Hiroshima City Univ.), Kazuhisa Haeiwa (Hiroshima City Univ.)

18AM1-C-3 Analysis on Chaotic Sequence with Biased Values for Noncoherent Chaos Communication  
Shintaro Arai (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.), Takaya Yamazato (Nagoya Univ.)

18AM1-C-4 Performance of the Recovered Pseudo-Noise Binary Sequences by Independent Component Analysis for CDMA  
Ryo Takahashi (RIKEN), Song-Ju Kim (National Institute of Information and Communications Technology), Ken Umeno (RIKEN)

18AM1-D: Hybrid and Switched Dynamical System
Date: September 18 (Tue) 09:00-10:20
Room: D (1600)
Chaired by: Toshimitsu Ushio (Osaka University)

18AM1-D-1 WTA-based Switching Strategy for Paralleled DC-DC Converters  
Yuki Ishikawa (Hosei Univ.), Toshimichi Saito (Hosei Univ.)

18AM1-D-2 Bifurcation of Simple Switched Dynamical Systems Based on Power Converters  
Yasuhide Ishige (Hosei Univ.), Yuki Ishikawa (Hosei Univ.), Toshimichi Saito (Hosei Univ.)

18AM1-D-3 Local Bifurcations of Nonlinear Hybrid Systems  
Quentin Brandon (Tokushima Univ.), Tetsushi Ueta (Tokushima Univ.), Takuji Kousaka (Oita Univ.), Danièle Fournier-Prunaret (INSA-Toulouse)

18AM1-D-4 Chaos in a Switched Dynamical System: Scicos as a Modeler and Simulator  
Fatima El Guezar (INSA-Toulouse / FS-Agadir), Hassane Bouzahir (ENSA-Agadir / Tokushima Univ.), Tetsushi Ueta (Univ. of Tokushima), Pascal Acco (INSA-Toulouse)

18AM1-E: Special Session; Numerical Computation with Result Verification I
Date: September 18 (Tue) 09:00-10:20
Room: E (1315)
18AM1-E-1 Inversion of Extremely Ill-conditioned Matrices using a Faithfully Rounded Dot Product
Siegfried M. Rump (Hamburg Univ. of Technology)

18AM1-E-2 A Class of Ill-Conditioned Nonlinear Algebraic Equations
Tetsuo Nishi (Waseda Univ.), Yusuke Nakaya (Waseda Univ.), Takeshi Ogita (Waseda Univ.), Shinichi Oishi (Waseda Univ.)

18AM1-E-3 A Computer-Assisted Multiplicity Proof for a Fourth-Order ODE on the Whole Real Line
Michael Plum (Univ. of Karlsruhe)

18AM1-E-4 Enclosures for Scalar Hyperbolic Conservation Laws
Vu Hoang (Institute for Analysis, Univ. of Karlsruhe)

18AM2-A: Special Session; Nano-Actuators and Applications
Date: September 18 (Tue) 10:40-12:20
Room: A (1520)
Chaired by: Vakhtang Putkaradze (Colorado State University)

18AM2-A-1 Dissipative Kinetic Equations and their Applications to Manipulations of Particles using AFM Tips
Vakhtang Putkaradze (Colorado State Univ.)

18AM2-A-2 Dynamics of Single Atoms and Molecules Manipulated at Material Surface
Takashi Hikihara (Kyoto Univ.)

18AM2-A-3 Numerical Study of Atom Interchange on Material Surface under Periodic Force
Byungsoo Kim (Colorado State Univ.), Takashi Hikihara (Kyoto Univ.), Vakhtang Putkaradze (Colorado State Univ.)

18AM2-A-4 Switching Mechanism in a Nonlinear Oscillator: Targeted Transitions
Igor Mezic (Univ. of California at Santa Barbara)

18AM2-B: Prediction and Identification
Date: September 18 (Tue) 10:40-12:20
Room: B (Segal)
Chaired by: Masaharu Adachi (Tokyo Denki University)
18AM2-B-1 Prediction of High-Dimensional Multivariate Information as an Amplitude-Event Dynamical System  
Naoki Yabuta (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)  

18AM2-B-2 Recovery of Chaotic Signals Using On-line ICA Algorithm  
Song-Ju Kim (NiCT), Ken Umeno (NiCT), Ryo Takahashi (RIKEN)  

18AM2-B-3 A Time-Frequency Method for Chaotic Flow  
Junfeng Sun (Hong Kong Polytechnic Univ.), Michael Small (Hong Kong Polytechnic Univ.)  

18AM2-B-4 [WIP] Robustness in Time Series Prediction based on Local Orbit Instability Method  
Hironori Sawayaanagi (Univ. of Fukui), Jousuke Kuroiwa (Univ. of Fukui), Haruhiko Shirai (Univ. of Fukui), Tomohiro Odaka (Univ. of Fukui), Hisakazu Ogura (Univ. of Fukui)  

18AM2-B-5 [WIP] Quantification of Fatigue Degree from Pulse Wave  
Hidenori Shigi (Kagawa Univ.), Hiroyuki Kitajima (Kagawa Univ.)  

18AM2-C: Sequences and Communications II  

Date: September 18 (Tue) 10:40-12:20  
Room: C (1425)  
Chaired by: Ryo Takahashi (RIKEN)  

18AM2-C-1 Optimal Spreading Sequences for Chaos-Based Communication Systems  
Theodore Papamarkou (Univ. of Warwick), Tony Lawrance (Univ. of Warwick)  

18AM2-C-2 Comparison of Chaotic Sequences in a Chaos-Based DS-CDMA System  
Georges Kaddoum (Toulouse Univ., INSA, LATTIS), Pascal Chargé (Toulouse Univ., INSA, LATTIS), Danièle Fournier-Prunaret (Toulouse Univ., INSA, LATTIS), Daniel Roviras (Toulouse Univ., ENSEEIHT, IRIT)  

18AM2-C-3 Chaotic Modulator with Volterra Filter for Cipher  
Kazuma Iwata (Meiji Univ.), Tsuyoshi Nakamura (Meiji Univ.), Toshiyuki Ikeue (Meiji Univ.), Hiroyuki Irikura (Meiji Univ.), Hiroyuki Kamata (Meiji Univ.)  

18AM2-C-4 A Cryptosystem Using Expansion of Chaotic Map  
Shuichi Aono (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)
18AM2-D: Special Session; Consistency and Synchronization II

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Room: D (1600)
Chaired by: Atsushi Uchida (Takushoku University)

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18AM2-D-2 Time-Shifts and Correlations in Synchronized Chaos 228
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18AM2-E: Special Session; Numerical Computation with Result Verification II

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Room: E (1315)
Chaired by: Michael Plum (Universitat Karlsruhe)

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Patrick J. Mckenna (Univ. of Connecticut)

18AM2-E-2 LP Narrowing: A New Strategy for Finding All Solutions of Nonlinear Equations 246
Koki Suda (Chuo Univ.), Kiyotaka Yamamura (Chuo Univ.)

18AM2-E-3 Fast Computation of Approximated Error Bound for Harmonic Balance Method Using Algebraic Representation 250
Masakazu Yagi (Kyoto Univ.), Takashi Hisakado (Kyoto Univ.)

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M.-N. Kim (Kyushu Univ.), Mitsuhiro T. Nakao (Kyushu Univ.), Yoshitaka Watanabe (Kyushu Univ.), Takaaki Nishida (Waseda Univ.)

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### 18PM1-B: Plenary Session II

Date: September 18 (Tue) 13:50-14:50  
Room: B (Segal)  
Chaired by: Kohshi Okumura (Hiroshima Institute of Technology)

**18PM1-B-1** Spatio-Temporal Oscillations by Wave Bifurcation

Toshiyuki Ogawa (Osaka Univ.)

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### 18PM2-A: Special Session; Applications of Nonlinear Dynamics to Infection Disease Dynamics

Date: September 18 (Tue) 15:10-16:50  
Room: A (1520)  
Chaired by: Peter Borwein (Simon Fraser University)

**18PM2-A-1** When Two and Two Do Not Make Four: the Nonlinear Dynamics of Infectious Diseases

Alexander Rutherford (Simon Fraser Univ.)

**18PM2-A-2** Scale-free Model for Spatio-Temporal Distribution of Outbreaks of Avian Influenza

Michael Small (Hong Kong Polytechnic Univ.)

**18PM2-A-3** The Fractal Character of Space-Time Epidemics

Richard Crandall (Reed College)

**18PM2-A-4** Competition among Viruses at the Within- and Between-Host Scales

Daniel Coombs (Univ. of British Columbia), Colleen Ball (Univ. of British Columbia), Michael Gilchrist (Univ. of Tennessee)

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### 18PM2-B: Learning and Clustering Algorithms

Date: September 18 (Tue) 15:10-16:50  
Room: B (Segal)  
Chaired by: Norikazu Takahashi (Kyushu University)
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<td>Clustering Algorithms Based on Tolerance Vector Concept</td>
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<td>18PM2-B-2</td>
<td>A New Working Set Selection for Decomposition-Type SVM Learning Algorithms</td>
<td>Norikazu Takahashi (Kyushu Univ.), Masashi Kuranoshita (Kyushu Univ.), Yusuke Kawazoe (Kyushu Univ.), Jun Guo (Kyushu Univ.), Jun’ichi Takeuchi (Kyushu Univ.)</td>
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<td>Self-Organizing Mapping that Considers Neighborhood Uniting</td>
<td>Mitsushi Yoshida (Sophia Univ.), Daisuke Shima (Sophia Univ.), Kaname Kurokawa (Sophia Univ.), Hisashi Aomori (Sophia Univ.), Mamoru Tanaka (Sophia Univ.)</td>
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<td>Gray Scale Display of Input Data Using Shooting SOM</td>
<td>Masato Tomita (Tokushima Univ.), Haruna Matsushita (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)</td>
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<td>18PM2-B-5</td>
<td>Fuzzy Adaptive Resonance Theory with Group Learning and its Applications</td>
<td>Haruka Isawa (Tokushima Univ.), Masato Tomita (Tokushima Univ.), Haruna Matsushita (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)</td>
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### 18PM2-C: Special Session; Complex Systems and Communication Networks

Date: September 18 (Tue) 15:10-16:50  
Room: C (1425)  
Chaired by: Riccardo Rovatti (University of Bologna) and Gianluca Setti (University of Ferrara)

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<td>Raúl Mondragón (Queen Mary Univ. of London)</td>
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<td>18PM2-C-2</td>
<td>Spatial Spectrum-Sharing Strategy in Cognitive Radio Networks</td>
<td>Kyungsup Kwak (Inha Univ.), Xizhi An (Inha Univ.)</td>
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<td>On Relation between Routing Strategy and Communication Quality in Wireless Multi-Hop Networks</td>
<td>Kazuyuki Miyakita (Niigata Univ.), Keisuke Nakano (Niigata Univ.), Yusuke Morioka (Niigata Univ.), Masakazu Sengoku (Niigata Univ.), Shoji Shinoda (Chuo Univ.)</td>
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<td>18PM2-C-4</td>
<td>A Bio-Inspired Algorithm for Performance Optimization in Wireless Sensor Networks</td>
<td>Chi-Tsun Cheng (Hong Kong Polytechnic Univ.), Chi K. Tse (Hong Kong Polytechnic Univ.), Francis C. m. Lau (Hong Kong Polytechnic Univ.)</td>
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<td>18PM2-C-5</td>
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Date: September 18 (Tue) 15:10-16:50
Room: D (1600)
Chaired by: Tetsuro Endo (Meiji University)

18PM2-D-1 A Dissipated Power-Based Analysis of Frequency Entrainment Described by van der Pol and PLL Equations 317
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18PM2-D-2 Synchronization of A Class of Second-Order Nonlinear Systems 321
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18PM2-E: Special Session; Numerical Computation with Result Verification III

Date: September 18 (Tue) 15:10-16:50
Room: E (1315)
Chaired by: Siegfried M. Rump (Hamburg University of Technology)

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18PM2-E-2 Accurate Matrix Multiplication with Multiple Floating-Point Numbers 337
Katsuhisa Ozaki (Waseda Univ.), Takeshi Ogita (Japan Science and Technology Agency),
Siegfried M. Rump (Hamburg Univ. of Technology), Shin’ichi Oishi (Waseda Univ.)

18PM2-E-3 Error-free Transformations in Real and Complex Floating Point Arithmetic
Stef Graillat (Univ. Paris 6), Valérie Ménissier-Morain (Univ. Paris 6)

18PM2-E-4 Tight Error Bounds for Approximate Solutions of Linear Systems
Takeshi Ogita (Japan Science and Technology Agency), Shin’ichi Oishi (Waseda Univ.)

18PM2-E-5 Accurate Summation by Sorting
Yozo Hida (Univ. of California at Berkeley)

19AM1-A: Control
Date: September 19 (Wed) 09:00-10:20
Room: A (1520)
Chaired by: Yuzo Ohta (Kobe University)

19AM1-A-1 An Investigation on the Absolute Stability of Discrete and Continuous Time Lur’e Systems
Roisin Duignan (UCD Dublin), Paul F. Curran (UCD Dublin)

19AM1-A-2 A Primal-Dual Beneath-Beyond Method
Yuzo Ohta (Kobe Univ.), Masashi Tsumura (Kobe Univ.)

19AM1-A-3 [WIP] Control Dynamics for Redundant Manipulator in Three-Dimensional Space
Masanori Kano (Sophia Univ.), Hisashi Aomori (Sophia Univ.), Mamoru Tanaka (Sophia Univ.)

19AM1-B: Neuro Dynamics I
Date: September 19 (Wed) 09:00-10:20
Room: B (Segal)
Chaired by: Yuko Osana (Tokyo University of Technology)

19AM1-B-1 Automatic Methods for Motor Intention Recognition from Spike Rates
Jugoslava Acimovic (EPFL), Alexandra Battaglia-Mayer (Università di Roma “La Sapienza”), Roberto Caminiti (Università di Roma “La Sapienza”), Martin Hasler (EPFL)

19AM1-B-2 Complexity Analysis for EEGs with Symbolic Entropy
Ying Liu (City Univ. of Hong Kong), Minfen Shen (Shantou Univ.), Wallace Tang (City Univ. of Hong Kong)

19AM1-B-3 Synchronization in Chaotic Spiking Neural Networks Using An Extended CSM-Scheme
Dai Maegawa (Altech Corporation), Kenji Murao (Univ. of Miyazaki), Kenji Ohno (Univ. of Miyazaki), Shao Jia (Univ. of Miyazaki)

19AM1-B-4 [WIP] Synchronization in Coupled Morris-Lecar Neurons with Class I and Class II Excitability
Ryosuke Ochi (Kagawa Univ.), Hiroyuki Kitajima (Kagawa Univ.)

19AM1-C: Signal Processing

Date: September 19 (Wed) 09:00-10:20
Room: C (1425)
Chaired by: Mitsuji Muneyasu (Kansai University)

19AM1-C-1 Noise-Assisted Detection in Sensor Network with Suboptimal Fusion of Optimal Detections
Shin Mizutani (NTT Communication Science Laboratories), Kenichi Arai (NTT Communication Science Laboratories), Peter Davis (NTT Communication Science Laboratories), Naoki Wakamiya (Osaka Univ.), Masayuki Murata (Osaka Univ.)

19AM1-C-2 Nonlinear Prediction on Image Signals using Radial Basis Function Network
Keisuke Narisawa (Saitama Univ.), Takashi Hoshino (Saitama Univ.), Naoki Yabuta (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)

19AM1-C-3 Sound-Morphing Method using Constructive Morse Theory
Yoshinao Shiraki (Shonan Institute of Technology)

19AM1-D: Coupled Oscillators I

Date: September 19 (Wed) 09:00-10:20
Room: D (1600)
Chaired by: Yasuteru Hosokawa (Shikoku University)

19AM1-D-1 Amplitude Death in Delayed Chaotic Systems Coupled by Diffusive Connections
Keiji Konishi (Osaka Prefecture Univ.), Hideki Kokame (Osaka Prefecture Univ.)

19AM1-D-2 Coexistence of Several Phase Synchronization in a Ring of Coupled Multi-State Chaotic Oscillators
Masahiro Wada (Konan Univ.), Yoshifumi Nishio (Tokushima Univ.)

19AM1-D-3 State Transition Phenomenon in Cross-Coupled Chaotic Circuits
Yumiko Uchitani (Tokushima Univ.), Ryo Imabayashi (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)
19AM2-A: Evolutional Dynamics in Social Systems

Date: September 19 (Wed) 10:40-12:20
Room: A (1520)
Chaired by: Kangrong Tan (Kurume University)

Kenichi Arai (NTT Communication Science Labs.), Takeshi Yamada (NTT Communication Science Labs.), Yukio Hayashi (Japan Advanced Institute of Science and Technology)

19AM2-A-2 Replicator Dynamics with Dynamic Payoff Reallocation Based on the Government’s Payoff
Takafumi Kanazawa (Osaka Univ.), Hayato Goto (Osaka Univ.), Toshimitsu Ushio (Osaka Univ.)

19AM2-A-3 [WIP] Performance Consensus Problem of Multi-agent Systems with Multiple State Variables
Naoki Hayashi (Osaka Univ.), Toshimitsu Ushio (Osaka Univ.)

Kangrong Tan (Kurume Univ.), Shozo Tokinaga (Kyushu Univ.)

19AM2-B: Neuro Dynamics II

Date: September 19 (Wed) 10:40-12:20
Room: B (Segal)
Chaired by: Kenji Murao (University of Miyazaki)

19AM2-B-1 New Measures for Estimating Neural Network Structures only from Multi-Spike Sequences
Tohru Ashizawa (Saitama Univ.), Daisuke Haraki (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)

19AM2-B-2 An adaptive Observer Design for Biological Neural Network Identification
Yu Mao (City Univ. of Hong Kong), Wallace Tang (City Univ. of Hong Kong), Ljupco Kocarev (Univ. of California San Diego)

19AM2-B-3 Significance of LTD Window in the Range of Positive Spike Timing of STDP Rule for Theta Phase Coding in a Network Having Background Noise
Jun Igarashi (Kyushu Institute of Technology), Hatsuo Hayashi (Kyushu Institute of Technology)

19AM2-B-4 Emergence of Self-Organized Structures in a Neural Network using Two Types of STDP Learning Rules
Hideyuki Kato (Saitama Univ.), Koji Han-Nuki (Saitama Univ.), Takayuki Kimura (Saitama Univ.), Tohru Ikeguchi (Saitama Univ.)
19AM2-C: Special Session; Nonlinear Speech and Image Processing

Date: September 19 (Wed) 10:40-12:20
Room: C (1425)
Chaired by: Hiroyuki Yashima (Tokyo University of Science)

19AM2-C-1 An Improvement Method of PAV Filters for the Removal of Impulse Noise from Highly Corrupted Images
Yoshihiro Kitaura (Kansai Univ.), Masaaki Teranishi (Kansai Univ.), Mitsuji Muneyasu (Kansai Univ.)

19AM2-C-2 Robust Speech Recognition Based on Running Speech Spectrum on Critical Band Intensity
Nongnuch Sukthangman (KMITL), Kraisin Songwatana (KMITL), Yoshikazu Miyazawa (Hokkaido Univ.)

19AM2-C-3 Image Denoising for Poisson Noise by Pixel Values Based Division and Wavelet Shrinkage
Shintaro Eda (Saitama Univ.), Tetsuya Shimamura (Saitama Univ.)

19AM2-C-4 A Study on a Speech Recognition Method Based on the Selective Sound Segregation in Various Noisy Environments
Atsushi Haniu (Japan Advanced Institute of Science and Technology), Masashi Unoki (Japan Advanced Institute of Science and Technology), Masato Akagi (Japan Advanced Institute of Science and Technology)

19AM2-C-5 A Blind Restoration Model for Bone-Conducted Speech Based on a Linear Prediction Scheme
Thang Tat Vu (Japan Advanced Institute of Science and Technology), Masashi Unoki (Japan Advanced Institute of Science and Technology), Masato Akagi (Japan Advanced Institute of Science and Technology)

19AM2-D: Coupled Oscillators II

Date: September 19 (Wed) 10:40-12:20
Room: D (1600)
Chaired by: Masahiro Wada (Konan University)

19AM2-D-1 Oscillation in Cyclic Coupled Systems
Hiroyuki Kitajima (Kagawa Univ.), Yo Horikawa (Kagawa Univ.)

19AM2-D-2 Pulse Wave Propagation and Interaction Phenomenon in a Large Number of Coupled van der Pol Oscillator Lattice
Kuniyasu Shimizu (Meiji Univ.), Tetsuro Endo (Meiji Univ.), Daishin Ueyama (Meiji Univ.)
19AM2-D-3  [WIP] Phase Synchronization Control in Partially Unlocking Oscillator Arrays
Noriko Miyazaki (Univ. of Electro-Communications), Hisa-Aki Tanaka (Univ. of Electro-Communications), Kuniyasu Shimizu (Meiji Univ.), Tetsuro Endo (Meiji Univ.)

19AM2-D-4  [WIP] Investigation of Asymmetrically Coupled Chaotic Circuits and Chaotic Maps
Yukari Kowatari (Shikoku Univ.), Yasuteru Hosokawa (Shikoku Univ.), Yoshifumi Nishio (Tokushima Univ.)

19PM1-A: Physics and Mechanics

Date: September 19 (Wed) 13:50-15:30
Room: A (1520)
Chaired by: Kenichi Arai (NTT Communication Science Laboratories)

19PM1-A-1  Terahertz Wave Oscillations in a Solid State Plasma without an Irradiation of the Laser Beams
Katsutoshi Kamakura (Darmstadt Univ. of Technology)

19PM1-A-2  Further Investigation for the SVD-based Analysis of Dynamical Noise on Chaos
Masaru Todoriki (The Univ. of Tokyo), Shuichi Hasegawa (The Univ. of Tokyo)

19PM1-A-3  A Numerical Study on Invariant Manifold Related to Transition of Intrinsic Localized Mode in Coupled Cantilever Array
Masayuki Kimura (Kyoto Univ.), Takashi Hikihara (Kyoto Univ.)

19PM1-A-4  Nonlinear Dynamics of a Flexible Rotor in Active Magnetic Bearings
Jawaid Inayat-Hussain (Monash Univ.)

19PM1-A-5  On Analysis and Control of the Cart-Pendulum System Modeled by Discrete Mechanics
Tatsuya Kai (Osaka Univ.), Yohei Yamamoto (Osaka Univ.)

19PM1-B: Associative Memory

Date: September 19 (Wed) 13:50-15:30
Room: B (Segal)
Chaired by: Yoko Uwate (Tokushima University)

19PM1-B-1  Entropy based Associative Model with Analogue Embedded Vectors
Masahiro Nakagawa (Nagaoka Univ. of Technology)

19PM1-B-2  Chaotic Complex-Valued Associative Memory
Masao Nakada (Tokyo Univ. of Technology), Yuko Osana (Tokyo Univ. of Technology)
19PM1-B-3 Kohonen Feature Map Associative Memory with Area Representation for Sequential Patterns
Yuta Iwai (Tokyo Univ. of Technology), Yuko Osana (Tokyo Univ. of Technology)

19PM1-B-4 Recalling Complex Sequences of Patterns Using Neurons with Hysteresis Property
Johan Sveholm (Tohoku Univ.), Yoshihiro Hayakawa (Tohoku Univ.), Koji Nakajima (Tohoku Univ.)

19PM1-C: Circuit Analysis and Design
Date: September 19 (Wed) 13:50-15:30
Room: C (1425)
Chaired by: Takashi Hisakado (Kyoto University)

19PM1-C-1 Spice-Oriented Optimization Algorithm of Amplifiers — Based on Nonlinear Programming —
Akio Ushida (Tokushima Bunri Univ.), Junji Kawata (Tokushima Bunri Univ.), Yoshihiro Yamagami (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)

19PM1-C-2 Implementation of Design Tool for Class E Switching Circuits Using SPICE
Hiroo Sekiya (Chiba Univ.), Tooru Ezawa (Chiba Univ.), Takashi Yahagi (Chiba Univ.)

19PM1-C-3 Spice-Oriented Harmonic Balance and Volterra Series Methods
Takaaki Kinouchi (Tokushima Univ.), Yoshihiro Yamagami (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.), Akio Ushida (Tokushima Bunri Univ.)

19PM1-C-4 Application and Estimation of Relaxation-Based Simulation Techniques to Interconnect and Plane Networks
Tadatoshi Sekine (Shizuoka Univ.), Yuichi Tanji (Kagawa Univ.), Hideki Asai (Shizuoka Univ.)

19PM1-C-5 [WIP] An Electric Circuit Analogue of a Mathematical Model for Adaptive Transport Network in True Slime Mold
Yuta Kondo (Univ. of Electro-Communications), Hisa-Aki Tanaka (Univ. of Electro-Communications)

19PM1-D: Bifurcation and Chaos
Date: September 19 (Wed) 13:50-15:30
Room: D (1600)
Chaired by: Yoshihiko Susuki (Kyoto University)

19PM1-D-1 Bifurcation of Nonlinear Spring Model of Self-Organizing Map
Haruna Matsushita (Tokushima Univ.), Yoshifumi Nishio (Tokushima Univ.)
Bifurcation Analysis for a Simple Chaotic Circuit and its Coupled Systems
Akihisa Tamura (Tokushima Univ.), Tetsushi Ueta (Tokushima Univ.)

WIP Bifurcation of Inter-Spike-Intervals of a Chaotic Spiking Oscillator with Piecewise Constant Characteristics
Tomonari Hasegawa (HOSEI Univ.), Yusuke Matsuoka (HOSEI Univ.), Toshimichi Saito (HOSEI Univ.)

WIP An Analysis of Non-periodic Oscillation During a Learning of a Complex-valued BAM
Ryuichi Sasaki (Tokyo Denki Univ.), Masaharu Adachi (Tokyo Denki Univ.)
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