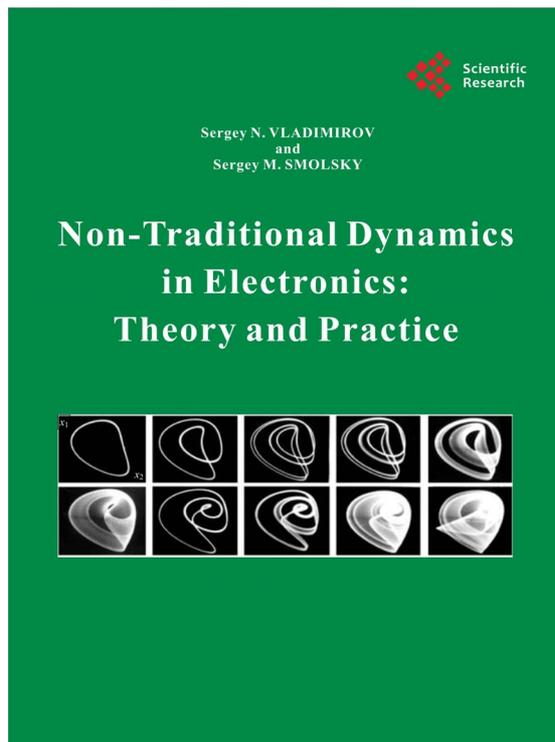


# Book Review of Non-Traditional Dynamics in Electronics: Theory and Practice

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The new book published by Scientific Research Publishers, USA in 2011 is devoted to investigation of properties of dynamic radio physical systems and to development of methodic fundamentals for creation the chaotic oscillation sources and forecasting of nonlinear dynamic system behavior at variation of its parameters.

The urgency of such investigation execution in this direction is determined both by the necessity of new ideas development in understanding of nonlinear dynamics of various processes independently upon its affiliation with the specific physics area and by need of the modern radio physics and radio electronics in sources of wide-band chaotic oscillations and signals. This book makes a considerable contribution in this area because it contains

theoretical, modeling and experimental results of the analysis of bifurcation phenomena and processes in chaotic systems as well as issues of information transmission using chaotic signals.

In this book for the first time the auto-parametric scenario of stochastization is described, conditions are formulated, at which movements in arbitrary dynamic systems are governed by the unified system of spectral-time equations. Phenomena of synchronization of chaotic movements and the intermit synchronization are discovered and investigated in detail. The bifurcation sense of the control parameter of modified logistic map is revealed, which ensures reproduction of strictly chaotic temporal sequences. The aggregate of this book's results may be classified as the new large scientific achievement.

Authenticity of results obtained is determined by its consistent (became classical) laws of dynamic system functioning and coincidence of numerical and physical experiments at testing of offered mathematical models of dynamic systems, and successful functioning of the described radio electronic devices.

This book contains preface and six chapters. To my opinion, all materials are reliable and to the right degree are supported by necessary theoretical and experimental substantiation. Authors on the basis of numerical and physical experiments prove earnestly the opportunity of existence of the strange non-chaotic attractor in non-autonomous radio electronic circuits at single-frequency sinusoidal influence and on the basis of result generalization of much number of numerical and physical experiments authors offer and substantiate the feasibility for the wide class oscillator and relaxation generation system of the specific stochastization scenario, which did not meet earlier in the scientific publications on nonlinear dynamics.

Theoretical analysis of modified logistic maps (MLM) and appropriate numerical and physical experiments allows authors to discover and investigate conditions of arising of the unknown phenomenon—intermittent synchronization. At last, some results of the book are checked by the functioning radio electronic devices.

Scientific and practical importance of investigations

described in the book consists in the following. The aggregate of theoretical and experimental results presented in the book is devoted to the separate aspects of nonlinear dynamics but it leads to the more deep understanding of processes of the chaotic dynamics for the rather wide class of electronic systems. So, authors specify relation between Lyapunov fractal and informational dimensions of the attractor proving the theorem on chaotization of MLM, substantiate the new scenario of synchronization and intermittent synchronization or chaotization processes.

As a whole, the book cannot pretend on finality of re-

search in this direction (it is impossible in the roughly developed area of knowledge) and it represents the fundamental investigation of a series of theoretical and applied aspects of nonlinear dynamic electronic systems.

The encyclopaedic knowledge of authors in the field of nonlinear physics, statistical radio physics, mathematical physics, the theory of random processes, computational mathematics make this book extremely valuable and essentially enrich for researchers. Sixth chapter has a great significance because in it authors give their own classification of dynamic systems, objects and processes but polemize with many authors in the field of nonlinear chaos.

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Index Terms—Deep learning theory, deep neural network, dynamical systems, stochastic optimal control. I. INTRODUCTION. D. In practice, DNN often generalizes remarkably well on unseen data when initialized properly [12]. Generalization of highly over-parametrized models cannot be properly explained without considering stochastic optimization algorithms. One of such attempts has been information bottleneck theory [18], which describes the dynamics of stochastic optimization using information theory, and connects it to optimal representation via the bottleneck principle. Another promising branch from Du et al. This is in contrast the least eigenvalue of the prediction dynamics in [19], [20], which is more related to the dynamical analysis in this review. Non-traditional dynamics in electronics: theory and practice. Paceo Segovia Irvine (USA, CA): Scientific Research Publ. Inc.; 2011. ABC book of young radio operator, or Introduction to radio electronics. Kiev: Osvita Ukrainy Publ.; 2012. 286 p. (in Russian).Google Scholar. About parallels in dynamics of radio electronic chaos generators having «prepared» and formed nonlinearity. Russ Phys J. 2015; 58(8/3):109–113 (in Russian).Google Scholar. Copyright information.