Contents

Editorial
T. Bountis, J. Johnson, A. Provata and G. Tsironis 883

Session A: Reviews

Synchronization patterns and chimera states in complex networks: Interplay of topology and dynamics
E. Schöll 891

Nonlinear dynamics and the Nano-mechanical control of electrons in crystalline solids
M.G. Velarde 921

Nonlinear wave propagation in discrete and continuous systems
V.M. Rothos 943

Fundamental concepts of quantum chaos
M. Robnik 959

Complexity methods applied to turbulence in plasma astrophysics
L. Vlahos and H. Isliker 977

Regular and chaotic orbits in the dynamics of exoplanets
K.I. Antoniadou 1001

From mechanical to biological oscillator networks: The role of long range interactions
T. Bountis 1017

Session B: Papers I

Hypernetworks: Multidimensional relationships in multilevel systems
J.H. Johnson 1037

Analytical study of chaos and applications
G. Contopoulos, M. Harsoula and C. Efthymiopoulos 1053

Resonant capture of multiple planet systems under dissipation and stable orbital configurations
G. Voyatzis 1071

Recent results on time-dependent Hamiltonian oscillators
M. Robnik 1087

On the symplectic integration of the discrete nonlinear Schrödinger equation with disorder
E. Gerlach, J. Meichsner and C. Skokos 1103

Transients in the synchronization of asymmetrically coupled oscillator arrays
C.E. Cantos, D.K. Hammond and J.J.P. Veerman 1115

Coexistence of up- and downstream traffic waves on a ring road
K. van der Weele and G. Kanellopoulos 1127

Coordinated aggregation in complex systems
V. Basios, S. Nicolis and J.L. Deneubourg 1143

Multi-chimera states and transitions in the Leaky Integrate-and-Fire model with nonlocal and hierarchical connectivity
N.D. Tsigkri-DeSmedt, J. Hizanidis, P. Hövel and A. Provata 1149

Dimension reduction in heterogeneous neural networks: Generalized Polynomial Chaos (gPC) and ANalysis-Of-VAriance (ANOVA)
M. Choi, T. Bertalan, C.R. Laing and I.G. Kevrekidis 1165

Session C: Papers II

Probing the statistics of transport in the Hénon Map
O. Alus, S. Fishman and J.D. Meiss 1181

Stability of gap solitons in the presence of a weak nonlocality in periodic potentials
I.K. Mylonas, A.K. Rossides and V.M. Rothos 1187

Signal velocity in oscillator arrays
C.E. Cantos, J.J.P. Veerman and D.K. Hammond 1199

Merlon-type density waves in a compartmentalized conveyor system
G. Kanellopoulos and K. van der Weele 1211

Strong perturbations in nonlinear systems
V. Basios 1219

Chimera states and synchronization in magnetically driven SQUID metamaterials
J. Hizanidis, N. Lazarides, G. Neofotistos and G.P. Tsironis 1231

Dynamics of the fraction of drug particles near the release boundary
E.V. Christidi and G. Kalosakas 1245

Dynamical complexity in the C. elegans neural network
C.G. Antonopoulos, A.S. Fokas and T.C. Bountis 1255

Methods of Information Geometry to model complex shapes
A. De Sanctis and S.A. Gattone 1271

Equation-free analysis of a dynamically evolving multigraph
A. Holiday and I.G. Kevrekidis 1281

Dominating sets and ego–centered decompositions in social networks
M.A. Boudourides and S.T. Lenis 1293

Impact of bankruptcy through asset portfolios
Y. Sakamoto and I. Vodenska 1311