

CONTENTS

Preface	v
Editorial Board of the BIOMAT Consortium	vii

Protein Structure and Function

Systems Protein folding as a physical stochastic process. <i>Kerson Huang</i> . 1	
Optimal methods for re-ordering data matrices in systems biology and drug discovery applications. <i>Peter A. DiMaggio Jr., Scott R. McAllister, Christodoulos A. Floudas, Xiao-Jiang Feng, Joshua D. Rabinowitz, Herschel A. Rabitz</i>	22
The solution of the distance geometry problem in protein modeling via geometric buildup. <i>Di Wu, Zhijun Wu, Yaxiang Yuan</i>	50
The differential geometry of proteins and its applications to structure determination. <i>Alain Goriely, Andrew Haurath, Sébastien Neukirch</i>	89

Modeling Physiological Disorders

Mathematical and computational modeling of physiological disorders: A case study of the IUPS human physiome project and aneurysmal models. <i>Alexander R. Oshmyansky, Philip K. Maini</i>	119
Modeling the growth and invasion of gliomas, from simple to complex: the Goldie Locks paradigm. <i>Russell Rockne, Ellsworth C. Alvord Jr., P. J. Reed, Kristin R. Swanson</i>	128
Advanced-delay differential equation for aeroelastic oscillations in physiology. <i>Jorge C. Lucero</i>	144
Geometry, activity-dependent mechanisms, membrane kinetics and channel density distribution interplay in single neuron plasticity. A computational study. <i>Enrico Cataldo, Marcello Brunelli, Evyatar Av-Ron, Yidao Cai, Douglas A. Baxter</i>	154

Population Dynamics

Models of Allee effects and their implications for population and community dynamics. <i>Luděk Berec</i>	179
--	-----

The decoupling & solution of logistic & classical two-species Lotka-Volterra dynamics with variable production rates. <i>Charles E. M. Pearce, Roy B. Leipnik</i>	208
Allee effect, emigration and immigration in a class of predator-prey models. <i>Eduardo González-Olivares, Jaime Mena-Lorca, Héctor Meneses-Alcay, Betsabé González-Yañez, José D. Flores</i>	222

Epidemiological Modeling

Epidemic predictions and predictability in complex environments. <i>Vittoria Colizza, Alain Barrat, Marc Barthélemy, Alessandro Vespignani</i>	247
Assessing the spatial propagation of West Nile virus. <i>Norberto A. Maidana, Hyun M. Yang</i>	259
Management of complex systems: modeling the biological pest control. <i>Marat Rafikov, José Manoel Balthazar, Hubertus F. von Bremen</i>	274

Biological and Chemical Pattern Recognition

On TuringHopf instabilities in reaction-diffusion systems. <i>Mariano Rodríguez Ricard</i>	293
Grasshopper density population classification with neural networks. <i>Isaias Chairez Hernández, J. Natividad Gurrola Reyes, Cipriano Garcia Gutierrez, Francisco Echavarria Chairez</i>	314

Modeling of Biosystems

A story of growing confusion: genes and their regulation. <i>Sonja J. Prohaska, Peter F. Stadler</i>	325
Geodesic curves for biomolecular structure modelling. <i>Rubem P. Mondaini, Roberto A. C. Prata</i>	346
Agent-based models or differential equations: two ways to learn about selection mechanisms in germinal centres. <i>Michael Meyer-Hermann</i>	358
Synchronization phenomena in protocell models. <i>Alessandro Filisetti, Roberto Serra, Timoteo Carletti, Irene Poli, Marco Villani</i>	373

Index	393
--------------------	-----