Record Nr. UNINA9910818467503321 Elements of computational systems biology / / edited by Huma M. **Titolo** Lodhi, Stephen H. Muggleton Pubbl/distr/stampa Oxford, : Wiley, c2010 **ISBN** 9786612548574 9781282548572 1282548573 9780470556757 0470556757 9780470556740 0470556749 Edizione [1st edition] Descrizione fisica 1 online resource (435 p.) Wilev series in bioinformatics Collana Altri autori (Persone) LodhiHuma M MuggletonStephen Disciplina 570.285 Soggetti Systems biology Computational biology Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references and index. Nota di contenuto ELEMENTS OF COMPUTATIONAL SYSTEMS BIOLOGY: CONTENTS: PREFACE; CONTRIBUTORS; PART I OVERVIEW; 1 Advances in Computational Systems Biology; 1.1 Introduction; 1.2 Multiscale Computational Modeling; 1.3 Proteomics; 1.4 Computational Systems Biology and Aging; 1.5 Computational Systems Biology in Drug Design; 1.6 Software Tools for Systems Biology; 1.7 Conclusion; References; PART II BIOLOGICAL NETWORK MODELING: 2 Models in Systems Biology: The Parameter Problem and the Meanings of Robustness; 2.1 Introduction; 2.2 Models as Dynamical Systems; 2.2.1 Continuous Models: 2.2.2 Discrete Models 2.3 The Parameter Problem 2.3.1 Parameter phobia; 2.3.2 Measuring and Calculating; 2.3.3 Counter Fitting; 2.3.4 Beyond Fitting; 2.4 The Landscapes of Dynamics; 2.4.1 Qualitative Dynamics; 2.4.2 Steady State

Attractors of ODE Models; 2.5 The Meanings of Robustness; 2.5.1 Parameter Biology; 2.5.2 Robustness to Initial Conditions; 2.5.3

Robustness in Reality; 2.5.4 Structural Stability; 2.5.5 Classifying Robustness: 2.6 Conclusion: References: 3 In Silico Analysis of Combined Therapeutics Strategy for Heart Failure; 3.1 Introduction; 3.2 Materials and Methods 3.2.1 Model Construction and Validation3.2.2 Classification of Different Heart Failure Cases; 3.2.3 Simulation Protocol; 3.3 Results; 3.3.1 -Adrenergic Receptor Antagonists; 3.3.2 -Adrenergic Receptor Kinase Inhibitor; 3.3.3 Phosphodiesterase Inhibitor; 3.3.4 Combined Therapies: 3.4 Discussion: Acknowledgment: 3A.1 Appendix: 3A.1.1 Model Validation; 3A.1.2 The Mathematical Model Used for Simulations; References; 4 Rule-Based Modeling and Model Refinement; 4.1 Kappa, Briefly; 4.2 Refinement, Practically; 4.2.1 A Simple Cascade; 4.2.2 Another Cascade; 4.2.3 The SSA Convention 4.2.4 A Less Obvious Refinement4.3 Rule-Based Modeling; 4.3.1 Notation: 4.3.2 Objects and Arrows: 4.3.3 Extensions: 4.3.4 Actions and Rules; 4.3.5 Events and Probabilities; 4.4 Refinement, Theoretically; 4.4.1 Growth Policies; 4.4.2 Simple Growth Policies; 4.4.3 Neutral Refinements; 4.4.4 Example Concluded; 4.4.5 Growth Policies, Concretely; 4.4.6 A Weakly Homogeneous Refinement; 4.4.7 Nonhomogeneous Growth Policies; 4.5 Conclusion; References; 5 A (Natural) Computing Perspective on Cellular Processes; 5.1 Natural Computing and Computational Biology: 5.2 Membrane Computing 5.3 Formal Languages Preliminaries 5.4 Membrane Operations with Peripheral Proteins: 5.5 Membrane Systems with Peripheral Proteins: 5.5.1 Dynamics of the System; 5.5.2 Reachability in Membrane Systems; 5.6 Cell Cycle and Breast Tumor Growth Control; 5.6.1 Cell Cycle Progression Inhibition in G1/S: 5.6.2 Cell-Cycle Progression Inhibition in G2/M; References; 6 Simulating Filament Dynamics in Cellular Systems; 6.1 Introduction; 6.2 Background: The Roles of Filaments within Cells; 6.2.1 The Actin Network; 6.2.2 Intermediate Filaments; 6.2.3 Microtubules; 6.3 Examples of Filament Simulations 6.3.1 Actin-Based Motility in Listeria

Sommario/riassunto

Groundbreaking, long-ranging research in this emergent field that enables solutions to complex biological problems. Computational systems biology is an emerging discipline that is evolving quickly due to recent advances in biology such as genome sequencing, high-throughput technologies, and the recent development of sophisticated computational methodologies. Elements of Computational Systems Biology is a comprehensive reference covering the computational frameworks and techniques needed to help research scientists and professionals in computer science, biology, chemistry, pharmaceutica