Record Nr. UNINA9910797037303321 Autore Northrop Robert B. Titolo Introduction to complexity and complex systems / / by Robert B. **Northrop** Boca Raton, FL:,: CRC Press, an imprint of Taylor and Francis,, 2010 Pubbl/distr/stampa **ISBN** 0-429-11309-9 1-4398-9498-1 Edizione [First edition.] Descrizione fisica 1 online resource (542 p.) Disciplina 570.11 Complexity (Philosophy) Soggetti Chaotic behavior in systems Biocomplexity 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. Nota di contenuto Front Cover; Contents; Preface; Author; 1. Introduction to Complexity and Complex Systems; 2. Introduction to Large Linear Systems; 3. Introduction to Biochemical Oscillators and Complex, Nonlinear Biochemical Systems; 4. Modularity, Redundancy, Degeneracy, Pleiotropy, and Robustness in Complex Biological Systems; 5. Evolution of Biological Complexity: Invertebrate Immune Systems; 6. Complex Adaptive and Innate Human Immune Systems; 7. Complexity in Quasispecies and MicroRNAs; 8. Introduction to Physiological Complexity: Examples of Models of Some Complex Physiological Systems 9. Quest for Quantitative Measures of Complexity 10. "Irreducible" and "Specified Complexity "in Living Systems; 11. Introduction to Complexity in Economic Systems; 12. Dealing with Complexity; Appendix A: SimnonTM Programs Used in Chapters 3 and 8; Appendix B: How to Use Root Locus to Determine the Stability of SISO Linear Control Systems: Appendix C: Bode Plots: Appendix D: Nyquist Plots: Glossary; Bibliography and Related Readings; Back Cover Sommario/riassunto The boundaries between simple and complicated, and complicated and

complex system designations are fuzzy and debatable, even using quantitative measures of complexity. However, if you are a biomedical

engineer, a biologist, physiologist, economist, politician, stock market speculator, or politician, you have encountered complex systems. Furthermore, your success depends on your ability to successfully interact with and manage a variety of complex systems. In order not to be blindsided by unexpected results, we need a systematic, comprehensive way of analyzing, modeling, and simulating complex systems to predict non-anticipated outcomes. In its engaging first chapters, the book introduces complex systems, Campbell's Law, and the Law of Unintended Consequences, and mathematics necessary for conversations in complex systems. Subsequent chapters illustrate concepts via commonly studied biological mechanisms. The final chapters focus on higher-level complexity problems, and introduce complexity in economic systems. Designed as a reference for biologists and biological engineers, Introduction to Complexity and Complex Systems lends itself to use in a classroom course to introduce advanced students studying biomedical engineering, biophysics, or physiology to complex systems. Engaging and illustrative, this book aids scientists and decision makers in managing biological complexity and complex systems.