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Titolo	Complex Adaptive Systems : Views from the Physical, Natural, and Social Sciences / / edited by Ted Carmichael, Andrew J. Collins, Mirsad Hadžikadi
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-030-20309-3
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (VIII, 250 p. 76 illus., 55 illus. in color.)
Collana	Understanding Complex Systems, , 1860-0832
Disciplina	006.30285436 620
Soggetti	Computational complexity Statistical physics Physics Complexity Applications of Nonlinear Dynamics and Chaos Theory Applications of Graph Theory and Complex Networks
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	The Fundamentals of Complex Adaptive Systems -- A Cognitive-Consistency Based Model of Population Wide Attitude Change -- An Application of Agent Based Social Modeling in the DoD -- Agent Based Behavior Precursor Model of Insider IT Sabotage -- Formal Measures of Dynamical Properties: Tipping Points, Robustness, and Sustainability -- Identifying Unexpected Behaviors of Agent-based Models through Spatial Plots and Heat Maps -- Simulating the Ridesharing Economy: The Individual Agent Metro-Washington Area Ridesharing Model (IAMWARM) -- Stigmergy for Biological Spatial Modeling -- Strategic group formation in the El Farol bar problem -- SwarmFSTaxis: Borrowing a Swarm Communication Mechanism from Fireflies and Slime Mold -- Teaching Complexity as Transdisciplinarity.
Sommario/riassunto	This book emerged out of international conferences organized as part of the AAAI Fall Symposia series, and the Swarmfest 2017 conference. It brings together researchers from diverse fields studying these complex

systems using CAS and agent-based modeling tools and techniques. In the past, the knowledge gained in each domain has largely remained exclusive to that domain. By bringing together scholars who study these phenomena, the book takes knowledge from one domain to provide insight into others. Most interesting phenomena in natural and social systems include constant transitions and oscillations among their various phases – wars, companies, societies, markets, and humans rarely stay in a stable, predictable state for long. Randomness, power laws, and human behavior ensure that the future is both unknown and challenging. How do events unfold? When do they take hold? Why do some initial events cause an avalanche while others do not? What characterizes these events? What are the thresholds that differentiate a sea change from a non-event? Complex adaptive systems (CAS) have proven to be a powerful tool for exploring these and other related phenomena. The authors characterize a general CAS model as having a large number of self-similar agents that: 1) utilize one or more levels of feedback; 2) exhibit emergent properties and self-organization; and 3) produce non-linear dynamic behavior. Advances in modeling and computing technology have led not only to a deeper understanding of complex systems in many areas, but they have also raised the possibility that similar fundamental principles may be at work across these systems, even though the underlying principles may manifest themselves differently.