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Adaptive Agents, Intelligence, and Emergent Human Organization Feb 03 2021
Emergent Complexity from Nonlinearity, in Physics, Engineering and the Life Sciences Jan 14 2022 This book collects contributions to the XXIII international conference “Nonlinear dynamics of electronic systems”. Topics range from non-linearity in electronic circuits to synchronisation effects in complex networks to biological systems, neural dynamics and the complex organisation of the brain. Resting on a solid mathematical basis, these investigations address highly interdisciplinary problems in physics, engineering, biology and biochemistry.
What Is a Complex System? Aug 29 2020 A clear, concise introduction to the quickly growing field of complexity science that explains its conceptual and mathematical foundations What is a complex system? Although "complexity science" is used to understand phenomena as diverse as the behavior of honeybees, the economic markets, the human brain, and the climate, there is no agreement about its foundations. In this introduction for students, academics, and general readers, philosopher of science James Ladyman and physicist Karoline Wiesner develop an account of complexity that brings the different concepts and mathematical measures applied to complex systems into a single framework. They introduce the different features of complex systems, discuss different conceptions of complexity, and develop their own account. They explain why complexity science is so important in today's world.
Emergent Complexity of Live Mediated Performance Aug 09 2021
Complexity and Postmodernism Mar 04 2021 In Complexity and Postmodernism, Paul Cilliers explores the idea of complexity in the light of contemporary perspectives from philosophy and science. Cilliers offers us a unique approach to understanding complexity and computational theory by integrating postmodern theory (like that of Derrida and Lyotard) into his discussion. Complexity and Postmodernism is an exciting and an original book that should be read by anyone interested in gaining a fresh understanding of complexity, postmodernism and connectionism.
Product Development Projects Nov 24 2022 This book presents an analysis of the dynamics and the complexity of new product development projects which are organized according to the concept of concurrent engineering. The approach of the authors includes both a theoretical and an empirical treatment of the topic, based on the theory of design structure matrices. Readers will discover diverse perspectives and mathematical models, as well as an extensive discussion of two case studies.
Emergent Behavior in Complex Systems Engineering Nov 12 2021 A comprehensive text that reviews the methods and technologies that explore emergent behavior in complex systems engineering in multidisciplinary fields In Emergent Behavior in Complex Systems Engineering, the authors present the theoretical considerations and the tools required to enable the study of emergent behaviors in manmade systems. Information Technology is key to today’s modern world. Scientific theories introduced in the last five decades can now be realized with the latest computational infrastructure. Modeling and simulation, along with Big Data technologies are at the forefront of such exploration and investigation. The text offers a number of simulation-based methods, technologies, and approaches that are designed to encourage the reader to incorporate simulation technologies to further their understanding of emergent behavior in complex systems. The authors present a resource for those designing, developing, managing, operating, and maintaining systems, including system of systems. The guide is designed to help better detect, analyse, understand, and manage the emergent behaviour inherent in complex systems engineering in order to reap the benefits of innovations and avoid the dangers of unforeseen consequences. This vital resource: Presents coverage of a wide range of simulation technologies Explores the subject of emergence through the lens of Modeling and Simulation (M&S) Offers contributions from authors at the forefront of various related disciplines such as philosophy, science, engineering, sociology, and economics Contains information on the next generation of complex systems engineering Written for researchers, lecturers, and students, Emergent Behavior in Complex Systems Engineering provides an overview of the current discussions on complexity and emergence, and shows how systems engineering methods in general and simulation methods in particular can help in gaining new insights in complex systems engineering.
Ancestors for the Pigs Apr 05 2021 This book brings together several new ways of thinking about pigs in the past, creating a dialogue by drawing on several kinds of approaches—from geography, ethnography, zoology, history, and archaeology—to enrich the way we all understand the evidence found in archaeological sites. MASCA Research Papers in Science and Archaeology 15
Complexity Perspectives on Researching Language Learner and Teacher Psychology May 26 2020 This edited volume brings together both established and emerging researcher voices from around the world to illustrate how complexity perspectives might contribute to new ways of researching and understanding the psychology of language learners and teachers in situated educational contexts. Chapter authors discuss their own perspectives on researching within a complexity paradigm, exemplified by concrete and original examples from their research histories. Moreover, chapters explore research approaches to a variety of learner and teacher psychological foci of interest in SLA. Examples include: anxiety, classroom group dynamics and group-level motivation, cognition and metacognition, emotions and emotion regulation strategies, learner reticence and silence, motivation, self-concept and willingness to communicate.
Knowledge Discovery and Emergent Complexity in Bioinformatics Jan 26 2023 This book constitutes the thoroughly refereed post-proceedings of the First International Workshop on Knowledge Discovery and Emergent Complexity in Bioinformatics, KDECB 2006, held in Ghent, Belgium, in May 2006, in connection with the 15th Belgium-Netherlands Conference on Machine Learning. The 12 revised full papers cover various topics in the areas of knowledge discovery and emergent complexity research in bioinformatics.
The Emergence of Complexity Feb 15 2022
Corn and Chiefs Sep 22 2022
Emergence, Complexity, and Self-organization Oct 23 2022 Emergence, Complexity, and Self-Organization have become vital focuses of interest not only in the fields of science and philosophy but also in the wider worlds of business and politics. This book presents a series of essays by thinkers who anticipated the significance of those issues and laid the foundations for their current importance. Readers of this book will encounter the important and varied figures of Immanuel Kant, John Stuart Mill, Charles Saunders Peirce, Henry Poincaré, Henri Bergson, Alfred North Whitehead, and the British "Emergentists" Samuel Alexander, C. Lloyd Morgan, and C. D. Broad. They will also find essays by the South African thinker and statesman Jan Smuts, the American philosopher Arthur Lovejoy, the eminent physicist Erwin Schrödinger, two more recent thinkers on emergence, P. E. Meehl and Wilfred Sellars, and Ludwig von Bertalanffy, one of the founders of General Systems Theory. In their detailed and comprehensive introduction to the collection, editors Alicia Juarrero and Carl A. Rubino set the essays in contexts stretching from Heraclitus, Parmenides, Plato, Aristotle, and Hegel to some of the religious, scientific, and philosophical challenges we face today.

Mobile Farmers Dec 01 2020 The author's ethnoarchaeological work among the Rarámuri (Tarahumara) of northern Mexico investigated how archaeologists can identify mobile agriculturalists.
Morphological Complexity Sep 29 2020 Inflectional morphology plays a paradoxical role in language. On the one hand it tells us useful things, for example that a noun is plural or a verb is in the past tense. On the other hand many languages get along perfectly well without it, so the baroquely ornamented forms we sometimes find come across as a gratuitous over-elaboration. This is especially apparent where the morphological structures operate at cross purposes to the general systems of meaning and function that govern a language, yielding inflection classes and arbitrarily configured paradigms. This is what we call morphological complexity. Manipulating the forms of words requires learning a whole new system of structures and relationships. This book confronts the typological challenge of characterising the wildly diverse sorts of morphological complexity we find in the languages of the world, offering both a unified descriptive framework and quantitative measures that can be applied to such heterogeneous systems.
Emergent Complexity of Microbial Communities in the Planetary Crust Jan 22 2020
Emergence Jan 02 2021 We are confronted with emergent systems everywhere and Holland shows how a theory of emergence can predict many complex behaviours in art and science. This book will appeal to scientists and anyone interested in scientific theory.
Using Complexity Theory for Research and Program Evaluation Dec 21 2019 Readers will learn how to frame their research using the components found in complex systems by using their existing knowledge of research methods and applying basic mathematical concepts. Concepts such as bordering between chaos and equilibrium, diverse perspectives, diverse heuristics, robustness, and wisdom of crowds are considered and applied to social work research studies. Basic introductions on game theory, graph theory, Boolean logic, decision theory, and network science provide the necessary mathematical background for understanding interconnectedness and networking.
Complexity in Entrepreneurship, Innovation and Technology Research Dec 13 2021 This volume discusses the challenge of dealing with complexity in entrepreneurship, innovation and technology research. Businesses as well as entire economies are increasingly being confronted by widespread complex systems. Fields such as entrepreneurship and innovation cannot ignore this reality, especially with their inherent links to diverse research fields and interdisciplinary methods. However, most methods that allow more detailed analyses of complex problems are either neglected in mainstream research or are, at best, still emerging. Against this backdrop, this book provides a forum for the discussion of emergent and neglected methods in the context of complexity in entrepreneurship, innovation and technology research, and also acts as an inspiration for academics across related disciplines to engage more in complexity research.
The Emergence of Complexity in Mathematics, Physics, Chemistry and Biology Oct 11 2021 In this volume, some of the world's leading scientists discuss the role of complexity across all the scientific disciplines. Opinions differ: for some, complexity holds the key to a deeper and fuller understanding of the world; to others, it is merely a modern version of the philsophers' stone.
From System Complexity to Emergent Properties Feb 27 2023 Emergence and complexity refer to the appearance of higher-level properties and behaviours of a system that obviously comes from the collective dynamics of that system's components. These properties are not directly deducible from the lower-level motion of that system. Emergent properties are properties of the "whole" that are not possessed by any of the individual parts making up that whole. Such phenomena exist in various domains and can be described, using complexity concepts and thematic knowledges. This book highlights complexity modelling through dynamical or behavioral systems. The pluridisciplinary purposes, developed along the chapters, are able to design links between a wide-range of fundamental and applicative Sciences. Developing such links - instead of focusing on specific and narrow researches - is characteristic of the Science of Complexity that we try to promote by this contribution.
Emerging Complexity Mar 16 2022 At the heart of Emerging Complexity is the thesis that complex societies developed independently during the Copper and Bronze Ages in south-east Spain.
Self-Organized Criticality May 18 2022 A clear and concise introduction to this new, cross-disciplinary field.
A Complexity Theory for Public Policy Jul 28 2020 Complexity theory has become popular in the natural and social sciences over the last few decades as a result of the advancements in our understanding of the complexities in natural and social phenomena. Concepts and methods of complexity theory have been applied by scholars of public affairs in North America and Europe, but a comprehensive framework for these applications is lacking. A Complexity Theory for Public Policy proposes a conceptual synthesis and sets a foundation for future developments and applications. In this book, Göktu? Morçöl convincingly makes the case that complexity theory can help us understand better the self-organizational, emergent, and co-evolutionary characteristics of complex policy systems. In doing so, he discuss the epistemological implications of complexity theory and the methods complexity researchers use, and those methods they could use. As the complexity studies spread more around the world in the coming decades, the contents of this book will become appealing to larger audiences, particularly to scholars and graduate students in public affairs. The unique combination of synthesis and explanation of concepts and methods found in this book will serve as reference frames for future works.
Ancestors and Elites Sep 10 2021 Ancestors and Elites examines prehispanic ritual behaviors characteristic of the Casas Grandes region of Chihuahua, Mexico. Gordon Rakita analyzes the archaeological data from the site with respect to broader anthropological theories regarding both religious practices and the rise of complex societies. This confluence of empirical fact and general theory allows Rakita to explore in detail the complex, reciprocal relationship between ritual practices and developing social complexity at PaquimZ, one of the best-documented archaeological sites in the region.
Complexity and Emergence Aug 21 2022 Complexity has become a central topic in certain sectors of theoretical physics and chemistry (for example, in connection with nonlinearity and deterministic chaos). Also, mathematical measurements of complexity and formal characterizations of this notion have been proposed. The question of how complex systems can show properties that are different from those of their constituent parts has nurtured philosophical debates about emergence and reductionism, which are particularly important in the study of the relationship between physics, chemistry, biology and psychology. This book offers a good presentation of those topics through a truly interdisciplinary approach in which the philosophy of science and the specialized topics of certain sciences are put in a dialogue.
Generative Complexity in a Complex Generative World Jun 19 2022 This book introduces a refreshing approach to twenty-first-century scientific approach in an age, which is also known as the Century of Complexity. It deals with the deep problem of complexity, being operative from the bottom-up. The current lack of understanding of complexity has led scholars into the so-called embarrassment of complexity. A long overdue paradigm shift is necessary to address complexity as generative complexity and brings readers to the edge of a scientific revolution: that is, a generative revolution in the Century of Complexity. The book offers a radical shift of paradigm from the paradigm of simplifying into the new generative paradigm of complexifying about processes that develop from the bottom-up. The book links complex generative reality with a corresponding radical new generative nature of order and explores new fronts in science. This book explores innovative concepts of interaction, of causality, of the unit of study, and of reality itself and enables readers to see complexity as generative, emergent complexity as being operative from the bottom-up. The book discusses and suggests solutions for the problem of complexity in this Century of Complexity. The author provides a new understanding of complexity based on a generative flux of forces and relations. The book aims to bring about a fundamental and foundational change in how we view and ‘do’ science for an interdisciplinary audience of academics ranging from social science and humanities to economy and biology.
Complexity, Language, and Life: Mathematical Approaches Oct 31 2020 In May 1984 the Swedish Council for Scientific Research convened a small group of investigators at the scientific research station at Abisko,

Sweden, for the purpose of examining various conceptual and mathematical views of the evolution of complex systems. The stated theme of the meeting was deliberately kept vague, with only the purpose of discussing alternative mathematically based approaches to the modeling of evolving processes being given as a guideline to the participants. In order to limit the scope to some degree, it was decided to emphasize living rather than nonliving processes and to invite participants from a range of disciplinary specialities spanning the spectrum from pure and applied mathematics to geography and analytic philosophy. The results of the meeting were quite extraordinary; while there was no intent to focus the papers and discussion into predefined channels, an immediate self-organizing effect took place and the deliberations quickly oriented themselves into three main streams: conceptual and formal structures for characterizing sys tem complexity; evolutionary processes in biology and ecology; the emergence of complexity through evolution in natural lan guages. The chapters presented in this volume are not the proceed ings of the meeting. Following the meeting, the organizers felt that the ideas and spirit of the gathering should be preserved in some written form, so the participants were each requested to produce a chapter, explicating the views they presented at Abisko, written specifically for this volume. The results of this exercise form the volume you hold in your hand.

Emergent Complexity Jun 26 2020 Serious interest in the evolution and dynamics of intermediate societies in their own right has grown by leaps and bounds during the past decade.

The Biggest Ideas in the Universe Apr 17 2022 INSTANT NEW YORK TIMES BESTSELLER “Most appealing... technical accuracy and lightness of tone... Impeccable.”—Wall Street Journal “A porthole into another world.”—Scientific American “Brings science dissemination to a new level.”—Science The most trusted explainer of the most mind-boggling concepts pulls back the veil of mystery that has too long cloaked the most valuable building blocks of modern science. Sean Carroll, with his genius for making complex notions entertaining, presents in his uniquely lucid voice the fundamental ideas informing the modern physics of reality. Physics offers deep insights into the workings of the universe but those insights come in the form of equations that often look like gobbledygook. Sean Carroll shows that they are really like meaningful poems that can help us fly over sierras to discover a miraculous multidimensional landscape alive with radiant giants, warped space-time, and bewilderingly powerful forces. High school calculus is itself a centuries-old marvel as worthy of our gaze as the Mona Lisa. And it may come as a surprise the extent to which all our most cutting-edge ideas about black holes are built on the math calculus enables. No one else could so smoothly guide readers toward grasping the very equation Einstein used to describe his theory of general relativity. In the tradition of the legendary Richard Feynman lectures presented sixty years ago, this book is an inspiring, dazzling introduction to a way of seeing that will resonate across cultural and generational boundaries for many years to come.

Complexity and the Arrow of Time Feb 21 2020 There is a widespread assumption that the universe in general, and life in particular, is 'getting more complex with time'. This book brings together a wide range of experts in science, philosophy and theology and unveils their joint effort in exploring this idea. They confront essential problems behind the theory of complexity and the role of life within it: what is complexity? When does it increase, and why? Is the universe evolving towards states of ever greater complexity and diversity? If so, what is the source of this universal enrichment? This book addresses those difficult questions, and offers a unique cross-disciplinary perspective on some of the most profound issues at the heart of science and philosophy. Readers will gain insights in complexity that reach deep into key areas of physics, biology, complexity science, philosophy and religion.

Engaging Emergence Jul 08 2021 What's Possible Now? Change is everywhere these days—at times it seems like barely controlled chaos. Yet within this turmoil are the seeds of a higher order. When a new system arises from the ashes of the old, science calls the process “emergence.” By engaging it, you can help yourself and your organization or community to successfully face disruption and emerge stronger than ever. In this profound, award winning (2011 Nautilus Gold medal winner) book, Peggy Holman offers principles, practices, and real-world stories to help you work with compassion, creativity, and wisdom through the entire arc of change—from disruption to coherence. You'll learn what to notice, what to explore, what to try, and what mindset opens new possibilities. This work can be challenging but also tremendously rewarding. It enables new and unlikely partnerships and develops breakthrough projects. You become part of a process that transforms the culture itself. “Very useful in giving structure and form to ways of dealing with the unpredictable and volatile way the world comes at us. A powerful antidote to the change management illusion that the future can be driven, engineered, managed, and drilled.” —Peter Block, author of Community “A dance manual for how to move gracefully with the disruption, uncertainty, and mystery that are part of life's rhythms, how to welcome interruption and discontinuity as opportunities for creativity, community, and greater capacity.” —Margaret J. Wheatley, author of Leadership and the New Science “Provides practical advice for orchestrating conflict and moving through discomfort to reach a new coherence." —Ronald Heifetz and Marty Linsky, cofounders of Cambridge Leadership Associates and coauthors of Leadership on the Line and The Practice of Adaptive Leadership

Complexity Leadership Nov 19 2019 This book introduces leadership and organizational scholars to the potenial of complexity science for broadening leadership study beyond its traditional focus on leaders’ actions and influence, to a consideration of leadership as a broader, dynamically and interactive organizing process. The book offers a primer on complexity science and its applications to organization studies, and compares the logics of complexity science with those underlying traditional leadership approaches. It describes methodological approaches for studying leadership from a complexity perspective, and offers examples of applications of complexity science to leadership theory. Chapters are written by top scholars in complexity and leadership theory.

Emergent Nested Systems Jun 07 2021 This book presents a theory as well as methods to understand and to purposively influence complex systems. It suggests a theory of complex systems as nested systems, i. e. systems that enclose other systems and that are simultaneously enclosed by even other systems. According to the theory presented, each enclosing system emerges through time from the generative activities of the systems they enclose. Systems are nested and often emerge unplanned, and every system of high dynamics is enclosed by a system of slower dynamics. An understanding of systems with faster dynamics, which are always guided by systems of slower dynamics, opens up not only new ways to understanding systems, but also to effectively influence them. The aim and subject of this book is to lay out these thoughts and explain their relevance to the purposive development of complex systems, which are exemplified in case studies from an urban system. The interested reader, who is not required to be familiar with system-theoretical concepts or with theories of emergence, will be guided through the development of a theory of emergent nested systems. The reader will also learn about new ways to influence the course of events - even though the course of events is, in principle, unpredictable, due to the ever-new emergence of real novelty.

A Crude Look at the Whole May 06 2021 A top expert explains why a social and economic understanding of complex systems will help society to anticipate and confront our biggest challenges Imagine trying to understand a stained glass window by breaking it into pieces and examining it one shard at a time. While you could probably learn a lot about each piece, you would have no idea about what the entire picture looks like. This is reductionism -- the idea that to understand the world we only need to study its pieces -- and it is how most social scientists approach their work. In A Crude Look at the Whole, social scientist and economist John H. Miller shows why we need to start looking at whole pictures. For one thing, whether we are talking about stock markets, computer networks, or biological organisms, individual parts only make sense when we remember that they are part of larger wholes. And perhaps more importantly, those wholes can take on behaviors that are strikingly different from that of their pieces. Miller, a leading expert in the computational study of complex adaptive systems, reveals astounding global patterns linking the organization of otherwise radically different structures: It might seem crude, but a beehive's temperature control system can help predict market fluctuations and a mammal's heartbeat can help us understand the "heartbeat" of a city and adapt urban planning accordingly. From enduring racial segregation to sudden stock market disasters, once we start drawing links between complex systems, we can start solving what otherwise might be totally intractable problems. Thanks to this revolutionary perspective, we can finally transcend the limits of reductionism and discover crucial new ideas. Scientifically founded and beautifully written, A Crude Look at the Whole is a powerful exploration of the challenges that we face as a society. As it reveals, taking the crude look might be the only

way to truly see.
Complexity Dec 25 2022 A look at the rebellious thinkers who are challenging old ideas with their insights into the ways countless elements of complex systems interact to produce spontaneous order out of confusion
Mesoscale Complexity and Emergent Behavior in Dense Granular Systems Mar 24 2020 Mesoscale Complexity and Emergent Behavior in Dense Granular Systems
Complexity Theory and Law Jul 20 2022 This collection of essays explores the different ways the insights from complexity theory can be applied to law. Complexity theory – a variant of systems theory – views law as an emergent, complex, self-organising system comprised of an interactive network of actors and systems that operate with no overall guiding hand, giving rise to complex, collective behaviour in law communications and actions. Addressing such issues as the unpredictability of legal systems, the ability of legal systems to adapt to changes in society, the importance of context, and the nature of law, the essays look to the implications of a complexity theory analysis for the study of public policy and administrative law, international law and human rights, regulatory practices in business and finance, and the practice of law and legal ethics. These are areas where law, which craves certainty, encounters unending, irresolvable complexity. This collection shows the many ways complexity theory thinking can reshape and clarify our understanding of the various problems relating to the theory and practice of law.
Simply Complexity Apr 24 2020 The new branch of science which will reveal how to avoid the rush hour, overcome cancer, and find the perfect date What do traffic jams, stock market crashes, and wars have in common? They are all explained using complexity, an unsolved puzzle that many researchers believe is the key to predicting - and ultimately solving - everything from terrorist attacks and pandemic viruses right down to rush hour traffic congestion. Complexity is considered by many to be the single most important scientific development since general relativity and promises to make sense of no less than the very heart of the Universe. Using it, scientists can find order emerging from seemingly random interactions of all kinds, from something as simple as flipping coins through to more challenging problems such as predicting shopping habits, the patterns in modern jazz, and the growth of cancer tumours.
The Emergence of Complexity Oct 19 2019 This book centres on a broadened view of complexity that will enrich engagement with complexity in the social sciences. The key idea is to employ complexity theory to develop a holistic account of practice, agency and expertise. In doing so, the book acknowledges and builds upon the relational character of reductive accounts. It draws upon recent theoretical work on complexity, emergence and relationality to develop a novel account of practice, agency and expertise in and for workplaces. Biological, psychological and social aspects of these are integrated. This novel account overcomes problems in current views of practice, agency and expertise, which suffer from reductive, or fragmented, analyses, based upon individuals, groups, or networks. In retrieving the experiential richness of human activity – often esteemed as the basis of generative and creative life – this book shows how complexity both emerges from, and is, a non-reductive feature of, human experience, especially in daily work. “...an ambitiously wide-ranging volume, questioning the key tenets of respected approaches ..... and offering ..... ‘novel accounts’, which draw on features of complexity thinking.... ...But they go further than any of us in their argument that: ‘whatever reductive moves are made, they ‘flow’ from holistic accounts of relationality which have already affectively engaged the purposes of a co-present group.’ This is the intellectual contribution that is built consistently and persuasively across the chapters.” Professor Emerita Anne Edwards, Oxford University "Hager and Beckett have written a book that will challenge more commonly held notions of agency, practice, skills, and learning. Centering their argument on complexity theory or, as they prefer, complexity thinking, Hager and Beckett argue that it is through relations that we raise questions about, gather data from, and make working sense of the complexity that surrounds us. Groups then, particularly small groups, hold and implement agentive power. And what the authors call co-present groups—ones in which holistic relationality occurs socially, and affectively in distinctive places—“draw us closer to each other, and harness our normativity by enabling negotiability and reason-giving.” If your field of study involves anything remotely sociocultural in nature or if you are just interested in the complex ways we engage as humans with our worlds, you should find a place for this book in your library." Bob Fecho, Teachers College, Columbia University, New York NY, USA

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