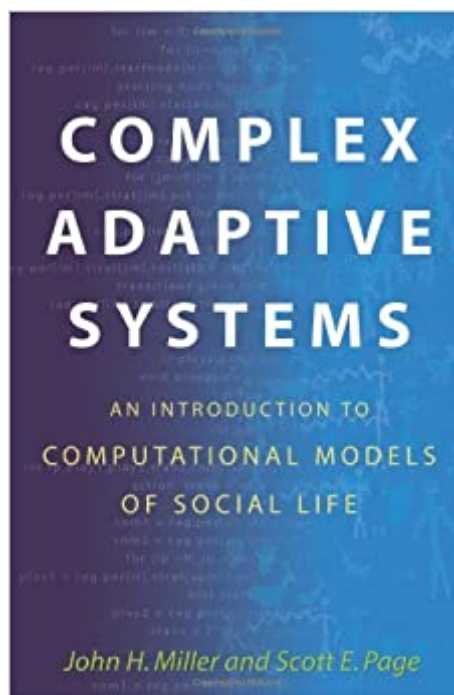**The book was found**

Complex Adaptive Systems: An Introduction To Computational Models Of Social Life (Princeton Studies In Complexity)

Synopsis

This book provides the first clear, comprehensive, and accessible account of complex adaptive social systems, by two of the field's leading authorities. Such systems--whether political parties, stock markets, or ant colonies--present some of the most intriguing theoretical and practical challenges confronting the social sciences. Engagingly written, and balancing technical detail with intuitive explanations, Complex Adaptive Systems focuses on the key tools and ideas that have emerged in the field since the mid-1990s, as well as the techniques needed to investigate such systems. It provides a detailed introduction to concepts such as emergence, self-organized criticality, automata, networks, diversity, adaptation, and feedback. It also demonstrates how complex adaptive systems can be explored using methods ranging from mathematics to computational models of adaptive agents. John Miller and Scott Page show how to combine ideas from economics, political science, biology, physics, and computer science to illuminate topics in organization, adaptation, decentralization, and robustness. They also demonstrate how the usual extremes used in modeling can be fruitfully transcended.

Book Information

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Customer Reviews

"Shows that computational modeling is slowly beginning to take root in the social sciences." -- Philip Ball, Nature

"The use of computational, especially agent-based, models has already shown its value in

illuminating the study of economic and other social processes. Miller and Page have written an orientation to this field that is a model of motivation and insight, making clear the underlying thinking and illustrating it by varied and thoughtful examples. It conveys with remarkable clarity the essentials of the complex systems approach to the embarking researcher."--Kenneth J. Arrow, winner of the Nobel Prize in economics"In Complex Adaptive Systems, two masters of this burgeoning field provide a highly readable and novel restatement of the logic of social interactions, linking individually based micro processes to macrosocial outcomes, ranging from Adam Smith's invisible hand to Thomas Schelling's models of standing ovations. The book combines the vision of a new Santa Fe school of computational, social, and behavioral science with essential 'how to' advice for apprentice modelers."--Samuel Bowles, author of Microeconomics: Behavior, Institutions, Evolution"This is a wonderful book that will be read by graduate students, faculty, and policymakers. The authors write in an extraordinarily clear manner about topics that are very technical and difficult for many people. I sat down to begin thumbing through and found myself deeply engaged."--Elinor Ostrom, author of Understanding Institutional Diversity

This is a unique and valuable book on complex adaptive systems which is focused specifically on the organizational context. Although Miller & Page describe their book as "an in introduction to computational models of social life" the general interest reader should appreciate its thorough and accessible discussion of complex systems without regard to the modeling aspect.Part I begins with simple examples of complexity and depicts how emergence can stem from the interaction of multiple agents acting semi-autonomously using simple rules. The theme is developed that individual agents (actors) form complex systems when they are interdependent in some way and these systems can generate complex and unpredictable behaviors without the benefit of a central controller. This leads to a brief but important discussion of some counter-intuitive characteristics of complex systems. For example, "adding noise to the system may actually enhance the ability of a system to find superior outcomes" (p. 30). Several examples make these ideas easy to understand and provide the groundwork for introducing agent-based modeling in Part II.In Part II, chapter 4 renders the important construct of "emergence" which is the defining characteristic of complex adaptive systems. The authors offer an excellent definition of emergence as "individual, localized behavior [that] aggregates into global behavior that is, in some sense, disconnected from its origins" (p. 44).Chapter 5 (Part III) begins the detailed discussion of agent-based modeling and computation as a theoretical approach to understanding complex systems. Agent-based models are said to have the capacity to produce "surprising results" (p. 67) because of the interaction of numerous random

and non-linear combinations of variables.Part IV develops ideas about modeling social systems. It primarily covers cellular automata without relying on heavy mathematics. While this is a necessary starting point to introduce some important concepts such as self-organized criticality and power-law phenomena (p. 165), cellular automata is a fairly limited approach to modeling human behavior and the book doesn't go much beyond this type of modeling to explain more sophisticated methods. In addition, most human and organizational behaviors don't follow power laws very closely, so these descriptions are informative but can be misleading. However, the authors correctly emphasize that human behavior is characteristically "fat-tailed" which is contrary to common misconceptions that (average) behavior is primarily Gaussian (normally distributed) in nature.Chapter 7 introduces an interesting but seemingly arbitrary framework of the Buddhist "Eightfold Way". This appears to be a forced rather than a natural fit to how agents act in organizations and is puzzling for its inclusion. Yet, I may be missing something obvious here. So it would seem to be helpful for the authors to better connect this with the rest of the book (or leave it out entirely). The next section moves immediately to a discussion of modeling forest fires, so at least a summary or transition would be helpful.Chapter 9 includes some interesting, albeit too brief, discussion of criticality in social systems (p. 177). Only one page is devoted to this topic. In contrast, nine pages were devoted to the "Eight-fold Way". Yet criticality in social systems seems to be the primary reason that one would study complexity in the first place. Hopefully, the authors will consider a revision of this book with some improved organization and a much expanded treatment of criticality.Overall, the authors introduce and effectively define numerous complexity constructs that apply directly to individuals and organizations. This makes the book relatively unique and valuable, separate from its focus on agent-based modeling. Perhaps the modeling component is less useful in practice because the authors posit that only very simple models can be readily validated and used for most real-life problems. Yet, these core concepts are a necessary starting point for any type of agent based modelling initiative. Consequently, I recommend this book to anyone working in this area.If you found this review helpful please click "Yes".

I was hooked by a very strong introduction. The authors have great command of the field and they offer a very clear, compelling invitation to the field of complex adaptive systems. In particular relatively weighty concepts are distilled to simple ideas which is only possible if you are a real domain expert. Later chapters transform into laundry-list type survey of the field but this is beneficial as a good broad introduction to the field.There is a particular focus on cellular automata models as a means to highlight adaptive agent principles.The authors show a lot of discipline by keeping each

topic tight so that every chapter is relatively meaty. The use of interesting footnotes provides just the right amount of related colour and helps to remind the reader that the authors have a broad experience in the field (as well as a good sense of humour).Overall a great survey that I will use as a jumping off point back into the primary literature.

This textbook aims at introducing a relatively new and emerging scientific approach, complex adaptive systems. Simply stated, we're talking about complex systems in the sense that their dynamic is far too complex or chaotic to be modeled using analytical equations. Examples of such systems are social phenomena including immigration patterns and segregation, biological patterns such as bees behavior and others. The underlying assumption is that the system under review is too complex to be modeled using mathematical tools, and/or are too complex to conduct laboratory experiments with. The new method introduced in this book talks about modeling a very simple system of interacting entities (agents), with very simple micro behavior rules, letting the system run and observing the emerging macro-behavior of the system as a whole.The book is a great textbook. Its flow of topics is in the correct order to taking the reader from the problem of why this approach is needed, through talking openly about the widespread criticism of this approach and tries answering it in a logical and intelligent way. It then continues to explaining what is a model and how to construct one and off to some examples that show other important corner stones of the field. I couldn't ask for a better arrangement of such book. The book is relatively easy to follow and can be used as an undergraduate textbook or for researchers who look for a good introduction to the field.Some minor problems that I stumbled upon while reading are as follow: (1) chapter 5 is extremely important as it tries to discuss the approach's criticism, however the arguments wasn't always convincing. Specifically, I would like to see some examples of problems X that are given to the neoclassical theorists, and see some discussions on their inability to deal with them and how this approach can cope with them. (2) The research problems that are introduced are very simple (as also stated by the authors themselves), I think that another chapter with two or three examples of real problems would make this book more valuable for the more knowledgeable readers (e.g. some of Epstein works). (3) After doing a lot of reading on that topic I am still amazed to find new terminology to similar ideas I think the field will mature and be more comprehensive to newcomers if the terminology will be standardize.Overall, this book provides a great introduction to the field, easy to follow, great arrangement of topics. Highly recommended.

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