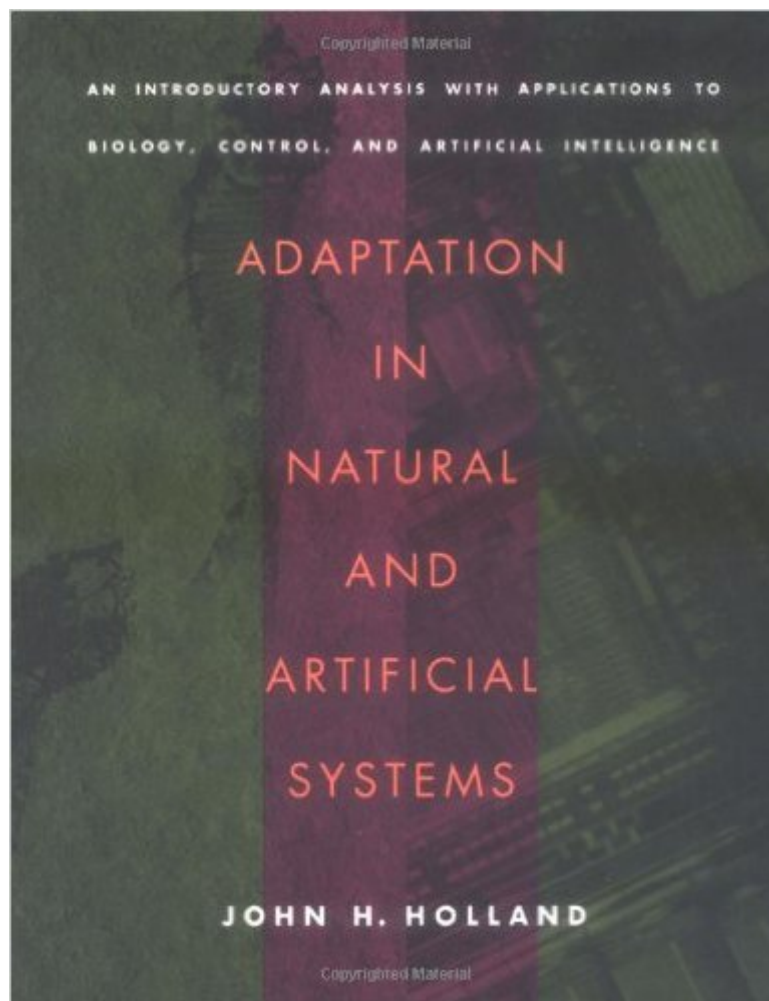


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Adaptation In Natural And Artificial Systems: An Introductory Analysis With Applications To Biology, Control, And Artificial Intelligence



Synopsis

Genetic algorithms are playing an increasingly important role in studies of complex adaptive systems, ranging from adaptive agents in economic theory to the use of machine learning techniques in the design of complex devices such as aircraft turbines and integrated circuits. *Adaptation in Natural and Artificial Systems* is the book that initiated this field of study, presenting the theoretical foundations and exploring applications. In its most familiar form, adaptation is a biological process, whereby organisms evolve by rearranging genetic material to survive in environments confronting them. In this now classic work, Holland presents a mathematical model that allows for the nonlinearity of such complex interactions. He demonstrates the model's universality by applying it to economics, physiological psychology, game theory, and artificial intelligence and then outlines the way in which this approach modifies the traditional views of mathematical genetics. Initially applying his concepts to simply defined artificial systems with limited numbers of parameters, Holland goes on to explore their use in the study of a wide range of complex, naturally occurring processes, concentrating on systems having multiple factors that interact in nonlinear ways. Along the way he accounts for major effects of coadaptation and coevolution: the emergence of building blocks, or schemata, that are recombined and passed on to succeeding generations to provide, innovations and improvements.

Book Information

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Customer Reviews

I am learning by myself the topic of Genetic Algorithms (GA) for my PhD dissertation. Even though this book is written for John H. Holland considered the father of Genetics Algorithms, this is not a basic or easy reading book. The book does not contain any source code and even though it contains some kind of pseudocode, it will not give you a clear idea about how to implement a GA. If you want an introduction book maybe you should look for the Mitchell Melanie's book "An Introduction to Genetic Algorithms" , Fogel's book "Evolutionary Computation vol. 1" or Chamber's book "The Practical Handbook of Genetic Algorithms". The way the author approaches the development of the framework is sometimes overwhelming because the author does not concentrate in one specific case or concept but he mentions all the different possibilities almost at the same time. I think it is worthwhile to buy the book to have it for advanced understanding of the concepts involved in the study of Complex Adaptive System. My approach to learn GA will be reading the above mentioned books and then study this book in a very detailed and slowly way to digest the huge amount of concepts and information provided by it.

This book presents an inspirational synthesis from mathematics, computer science and systems theory addressing genetic algorithms and their role in intelligent engineering/business systems. Topics include: background, a formal framework, illustrations (genetics, economics, game playing, searches, pattern recognition and statistical inference, control and function optimization, and central-nervous system), schemata, the optimal allocation of trials, reproductive plans and genetic operators, the robustness of genetic plans, adaptation of coding and representations, and overview, interim and prospectus. Inclusion of a disk of spreadsheet-based examples would have increased user-friendliness to the sometimes moderately-complex mathematics. Otherwise, this book is a well presented, and useful classic for researchers and software vendors seeking to develop more innovative intelligent products.

Good, however, the .com listing did not say that this text was geared for Ph.D.'s in Mathematics.

There's no source code here. This is the original book from the 70s about the theoretical basis for genetic-style adaptation, and the surprising parallels between evolution, gambling, and learning in general. foundational, clear, mathematical. Probably won't help you pass your assignments though.

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