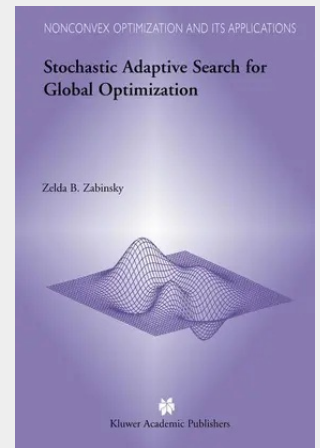


Stochastic Adaptive Search for Global Optimization

The field of global optimization has been developing at a rapid pace. There is a journal devoted to the topic, as well as many publications and notable books discussing various aspects of global optimization. This book is intended to complement these other publications with a focus on stochastic methods for global optimization. Stochastic methods, such as simulated annealing and genetic algorithms, are gaining in popularity among practitioners and engineers because they are relatively easy to program on a computer and may be easily applied to a broad class of global optimization problems. However, the theoretical performance of these stochastic methods is not well understood. In this book, an attempt is made to describe the theoretical properties of several stochastic adaptive search methods. Such a theoretical understanding may allow us to better predict algorithm performance and ultimately design new and improved algorithms. This book consolidates a collection of papers on the analysis and development of stochastic adaptive search. The first chapter introduces random search algorithms. Chapters 2-5 describe the theoretical analysis of a progression of algorithms. A main result is that the expected number of iterations for pure adaptive search is linear in dimension for a class of Lipschitz global optimization problems. Chapter 6 discusses algorithms, based on the Hit-and-Run sampling method, that have been developed to approximate the ideal performance of pure random search. The final chapter discusses several applications in engineering that use stochastic adaptive search methods.

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