
Preface

This book aims to cover major methodological and theoretical developments in the field of stochastic global optimization. This field includes global random search and methods based on probabilistic assumptions about the objective function.

We discuss the basic ideas lying behind the main algorithmic schemes, formulate the most essential algorithms and outline the ways of their theoretical investigation. We try to be mathematically precise and sound but at the same time we do not often delve deep into the mathematical detail, referring instead to the corresponding literature. We often do not consider the most general assumptions, preferring instead simplicity of arguments. For example, we only consider continuous finite dimensional optimization despite the fact that some of the methods can easily be modified for discrete or infinite-dimensional optimization problems.

The authors' interests and the availability of good surveys on particular topics have influenced the choice of material in the book. For example, there are excellent surveys on simulated annealing (both on theoretical and implementation aspects of this method) and evolutionary algorithms (including genetic algorithms). We thus devote much less attention to these topics than they merit, concentrating instead on the issues which are not that well documented in literature. We also spend more time discussing the most recent ideas which have been proposed in the last few years.

We hope that the text of the book is accessible to a wide circle of readers and will be appreciated by those interested in theoretical aspects of global optimization as well as practitioners interested mostly in the methodology. The target audience includes graduate students and researchers in operations research, probability, statistics, engineering (especially mechanical, chemical and financial engineering). All those interested in applications of global optimization can also benefit from the book.

The structure of the book is as follows. In Chapter 1, we discuss general concepts and ideas of global optimization in general stochastic global optimization in particular. In Chapter 2, we describe basic global random search

algorithms, study them from different view-points and discuss various probabilistic and statistical aspects associated with these algorithms. In Chapter 3, we discuss and study several more sophisticated global optimization techniques including random and semi-random coverings, random multistart, stratified sampling schemes, Markovian algorithms and finally the methods of generations. In Chapter 4, techniques based on the use of statistical models about the objective function are studied. The Introduction and Chapter 1 are written by both co-authors. Chapters 2 and 3 are written by A.Zhigljavsky, Chapter 4 is written by A.Žilinskas.

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