Preface

Randomized search heuristics such as evolutionary algorithms, evolution strategies, genetic algorithms, simulated annealing or ant colony and particle swarm optimization are recognized as powerful optimization algorithms and play an important role in modern algorithmics nowadays. While their success in many application fields is undoubted, we have little theoretical understanding why and when these methods work well.

The theory of randomized search heuristics tries to answer these fundamental questions. In spite of being a young field, substantial advances have been made in the last years. In this book, the first one covering theoretical aspects of different randomized search heuristics, we aim at both giving an introduction to this field and presenting recent progress. By collecting important results spread over many different conference or journal papers so far, this book shall also serve as a reference for future research work.

The different chapters cover randomized search heuristics for discrete/combinatorial and continuous search spaces. Though single objective optimization is mainly addressed, one chapter is fully devoted to multi-objective optimization. Another chapter is dedicated to the famous No-Free-Lunch theorem.

We editors are deeply indebted to the contributors of this book. They did an outstanding job making their expertise easily accessible to a broad audience. We are thankful to the reviewers of the different chapters for their constructive careful reviews. Our deepest thanks also go to Liang Quan, Gregory Lee, and all other staff of World Scientific Publishing Co. for their help and patience. Finally, we are very happy that Ming-Yang Kao, associate editor of the book series on Theoretical Computer Science, suggested to write this book and provided the contact to the publisher.

This book is dedicated to Ingo Wegener, who much too early passed away on November 26, 2008. Without his pioneering work this field would have never gotten the maturity it now has.

We hope that the reader enjoys this book. We are grateful for any comments and any notifications of (hopefully only very few) errors. We plan to set up a web-site to communicate them. Needless to say, any comment also helps improving a new edition of the book.

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