

# State of the Art in Global Optimization

# Nonconvex Optimization and Its Applications

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Volume 7

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# State of the Art in Global Optimization

*Computational Methods and Applications*

Edited by

C. A. Floudas

*Princeton University*

and

P. M. Pardalos

*University of Florida*



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## Preface

Optimization problems abound in most fields of science, engineering, and technology. In many of these problems it is necessary to compute the global optimum (or a good approximation) of a multivariable function. The variables that define the function to be optimized can be continuous and/or discrete and, in addition, many times satisfy certain constraints.

Global optimization problems belong to the complexity class of NP-hard problems. Such problems are very difficult to solve. Traditional descent optimization algorithms based on local information are not adequate for solving these problems. In most cases of practical interest the number of local optima increases, on the average, exponentially with the size of the problem (number of variables). Furthermore, most of the traditional approaches fail to escape from a local optimum in order to continue the search for the global solution.

Global optimization has received a lot of attention in the past ten years, due to the success of new algorithms for solving large classes of problems from diverse areas such as engineering design and control, computational chemistry and biology, structural optimization, computer science, operations research, and economics.

This book contains refereed invited papers presented at the conference on "State of the Art in Global Optimization: Computational Methods and Applications" held at Princeton University, April 28-30, 1995. The conference presented current research on global optimization and related applications in science and engineering. The papers included in this book cover a wide spectrum of approaches for solving global optimization problems and applications.

We feel that the book will definitely be a valuable source of information to faculty, students and researchers in optimization, engineering, mathematics, computer sciences, and computational chemistry. We would like to take the opportunity to thank the authors of the papers, the referees, the school of engineering and applied science of Princeton University for supporting this effort, and the publisher for assisting us in producing this book.

Christodoulos A. Floudas and Panos M. Pardalos

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