

Preface

This book describes research works that explore different advanced optimization techniques such as GA, PSO, ABC, HEA, DE, AIA, BBO and GEM for mechanical design. This book also includes the modifications of PSO, HEA and ABC to increase the effectiveness of the existing PSO, HEA and ABC techniques. The modified techniques are validated through application to unconstrained and constrained benchmark functions as well as to mechanical design optimization problems. Also new hybrid optimization techniques combining ABC with PSO, BBO, DE and GA are developed and are validated through benchmark functions and mechanical design problems. Moreover, a new efficient and effective optimization technique named as “Teaching–Learning-Based Optimization (TLBO)” is developed for the global optimization problems. The advantage of this new technique is that it does not need any algorithm parameters for it to working and so it eliminates the disadvantages of many existing optimization techniques which need tuning of algorithm parameters.

The algorithms and computer codes for various advanced optimization techniques included in this book will be very useful to the readers. This book is expected to be very useful to the industrial product designers for realizing a product as it presents advanced optimization techniques to make their tasks easier, logical, efficient and effective. This book is intended for designers, practitioners, managers, institutes involved in design-related projects, applied research workers, academics and graduate students in mechanical and industrial design engineering. As such, this book is expected to become a valuable reference for those wishing to do research on the use of advanced optimization techniques for solving single/multi-objective combinatorial design optimization problems.

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While every attempt has been made to ensure that no errors (printing or otherwise) enter the book, the possibility of these creeping into the book is always there. We will be grateful to the readers if these errors are pointed out. Suggestions for further improvement of the book will be thankfully acknowledged.

Surat, September 2011

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