Preface

The first edition of the *Handbook of Metaheuristics* was published in 2003 under the editorship of Fred Glover and Gary A. Kochenberger. Given the numerous developments observed in the field of metaheuristics in recent years, it appeared that the time was ripe for a second edition of the *Handbook*. For different reasons, Fred and Gary were unable to accept Springer’s invitation to prepare this second edition and they suggested that we should take over the editorship responsibility of the *Handbook*. We are deeply honored and grateful for their trust.

As stated in the first edition, metaheuristics are “solution methods that orchestrate an interaction between local improvement procedures and higher level strategies to create a process capable of escaping from local optima and performing a robust search of a solution space.” Although this broad characterization still holds today, many new and exciting developments and extensions have been observed in the last few years. We think in particular to hybrids, which take advantage of the strengths of each of their individual metaheuristic components to better explore the solution space. Hybrids of metaheuristics with other optimization techniques, like branch-and-bound, mathematical programming or constraint programming are also increasingly popular. On the front of applications, metaheuristics are now used to find high-quality solutions to an ever-growing number of complex, ill-defined real-world problems, in particular combinatorial ones.

This second edition of the *Handbook of Metaheuristics*, through its 21 chapters, is designed to provide a broad coverage of the concepts, implementations, and applications in this important field of optimization. We were glad to get a positive response from renowned experts for each chapter. They either accepted to revise and update their chapter from the first edition or to write brand new ones. The *Handbook* now includes updated chapters on the best known metaheuristics, including simulated annealing, tabu search, variable neighborhood search, scatter search and path relinking, genetic algorithms, memetic algorithms, genetic programming, ant colony optimization, multi-start methods, greedy randomized adaptive search procedure, guided local search, hyper-heuristics, and parallel metaheuristics. It also contains three new chapters on large neighborhood search, artificial immune systems, and hybrid metaheuristics. The last four chapters are devoted to more general issues
related to the field of metaheuristics, namely reactive search, stochastic search, fitness landscape analysis, and performance comparison. A few chapters from the first edition were discarded, as they appear to be less relevant.

We think that this *Handbook* will be a great reference for researchers and graduate students, as well as practitioners. Each presentation, although exhibiting inevitable stylistic differences, adheres to some common principles which results in stand-alone chapters that can be read individually.

We are grateful to all authors for taking the time to write the chapters that appear in this *Handbook*. We are also very grateful to Fred Hillier, Neil Levine, and Matthew Amboy of Springer for their encouragements, support, and patience at the different stages of production of this book.

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