METAHEURISTIC ALGORITHMS

overview, applications, and modifications

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Metaheuristics Algorithms: Overview, Applications, and Modifications

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Preface

Metaheuristic algorithms have emerged as essential tools for solving complex optimization problems across disciplines such as engineering, logistics, finance, and healthcare. Their ability to efficiently explore large, nonlinear, and uncertain search spaces makes them highly effective where traditional methods often fail.

This book, *Metaheuristics Algorithms: Overview, Applications, and Modifications*, offers a structured overview of key algorithmic families—including evolutionary, swarm-based, physics-inspired, and human-based approaches—supported by theoretical foundations, classifications, and real-world applications. Emphasis is placed on recent advancements, hybridizations, and performance-enhancing modifications.

Designed for students, researchers, and practitioners, the content balances academic rigor with practical relevance, aiming to guide both implementation and innovation in metaheuristic optimization.

I am grateful to my colleagues and reviewers for their valuable input, and to Reta N. Mussa for the attractive design of the book cover. My appreciation also extends to Deep Science Publishing for enabling its open-access dissemination. I hope this work contributes meaningfully to advancing research in computational intelligence and intelligent optimization.

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