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Adaptive and Multilevel Metaheuristics

 Springer

Adaptive And Multilevel Metaheuristics Studies In Computational Intelligence

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Adaptive And Multilevel Metaheuristics Studies In Computational Intelligence:

Adaptive and Multilevel Metaheuristics Carlos Cotta, Marc Sevaux, Kenneth Sörensen, 2008-06-17 One of the keystones in practical metaheuristic problem solving is the fact that tuning the optimization technique to the problem under consideration is crucial for achieving top performance This tuning customization is usually in the hands of the algorithm designer and despite some methodological attempts it largely remains a scientific art Transferring a part of this customization effort to the algorithm itself endowing it with smart mechanisms to self adapt to the problem has been a long pursued goal in the field of metaheuristics These mechanisms can involve different aspects of the algorithm such as for example self adjusting the parameters self adapting the functioning of internal components evolving search strategies etc Recently the idea of hyperheuristics i e using a metaheuristic layer for adapting the search by selectively using different low level heuristics has also been gaining popularity This volume presents recent advances in the area of adaptativeness in metaheuristic optimization including up to date reviews of hyperheuristics and self adaptation in evolutionary algorithms as well as cutting edge works on adaptive self adaptive and multilevel metaheuristics with application to both combinatorial and continuous optimization

Differential Evolution in Electromagnetics Anyong Qing, Ching Kwang Lee, 2010-05-28 Differential evolution has proven itself a very simple while very powerful stochastic global optimizer It has been applied to solve problems in many scientific and engineering fields This book focuses on applications of differential evolution in electromagnetics to showcase its achievement and capability in solving synthesis and design problems in electromagnetics Topics covered in this book include A comprehensive up to date literature survey on differential evolution A systematic description of differential evolution A topical review on applications of differential evolution in electromagnetics Five new application examples This book is ideal for electromagnetic researchers and people in differential evolution community It is also a valuable reference book for researchers and students in the optimization or electrical and electronic engineering field In addition managers and engineers in relevant fields will find it a helpful introductory guide

Computational Intelligence - Volume II Hisao Ishibuchi, 2015-12-30 Computational intelligence is a component of Encyclopedia of Technology Information and Systems Management Resources in the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty one Encyclopedias Computational intelligence is a rapidly growing research field including a wide variety of problem solving techniques inspired by nature Traditionally computational intelligence consists of three major research areas Neural Networks Fuzzy Systems and Evolutionary Computation Neural networks are mathematical models inspired by brains Neural networks have massively parallel network structures with many neurons and weighted connections Whereas each neuron has a simple input output relation a neural network with many neurons can realize a highly non linear complicated mapping Connection weights between neurons can be adjusted in an automated manner by a learning algorithm to realize a non linear mapping required in a particular application task Fuzzy systems are

mathematical models proposed to handle inherent fuzziness in natural language For example it is very difficult to mathematically define the meaning of cold in everyday conversations such as It is cold today and Can I have cold water The meaning of cold may be different in a different situation Even in the same situation a different person may have a different meaning Fuzzy systems offer a mathematical mechanism to handle inherent fuzziness in natural language As a result fuzzy systems have been successfully applied to real world problems by extracting linguistic knowledge from human experts in the form of fuzzy IF THEN rules Evolutionary computation includes various population based search algorithms inspired by evolution in nature Those algorithms usually have the following three mechanisms fitness evaluation to measure the quality of each solution selection to choose good solutions from the current population and variation operators to generate offspring from parents Evolutionary computation has high applicability to a wide range of optimization problems with different characteristics since it does not need any explicit mathematical formulations of objective functions For example simulation based fitness evaluation is often used in evolutionary design Subjective fitness evaluation by a human user is also often used in evolutionary art and music These volumes are aimed at the following five major target audiences University and College students Educators Professional practitioners Research personnel and Policy analysts managers and decision makers

Metaheuristics Patrick Siarry, 2016-12-24 Metaheuristics exhibit desirable properties like simplicity easy parallelizability and ready applicability to different types of optimization problems After a comprehensive introduction to the field the contributed chapters in this book include explanations of the main metaheuristics techniques including simulated annealing tabu search evolutionary algorithms artificial ants and particle swarms followed by chapters that demonstrate their applications to problems such as multiobjective optimization logistics vehicle routing and air traffic management The authors are leading researchers in this domain with considerable teaching and applications experience and the book will be of value to industrial practitioners graduate students and research academics

Handbook of Metaheuristics Michel Gendreau, Jean-Yves Potvin, 2018-09-20 The third edition of this handbook is designed to provide a broad coverage of the concepts implementations and applications in metaheuristics The book's chapters serve as stand alone presentations giving both the necessary underpinnings as well as practical guides for implementation The nature of metaheuristics invites an analyst to modify basic methods in response to problem characteristics past experiences and personal preferences and the chapters in this handbook are designed to facilitate this process as well This new edition has been fully revised and features new chapters on swarm intelligence and automated design of metaheuristics from flexible algorithm frameworks The authors who have contributed to this volume represent leading figures from the metaheuristic community and are responsible for pioneering contributions to the fields they write about Their collective work has significantly enriched the field of optimization in general and combinatorial optimization in particular 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 In addition many new and exciting developments and extensions have been observed in the last few years 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 handbook should continue to be a great reference for researchers graduate students as well as practitioners interested in metaheuristics *Handbook of Heuristics* Rafael Martí,Panos M.

Pardalos,Mauricio G.C. Resende,2025-11-17 The handbook of heuristics consists of five main parts search strategies local search metaheuristics analysis and implementations and applications They cover from search methods and methodological aspects such as matheuristics the exciting field in which mathematical programming is combined with heuristics to applications that provide the practitioner with a description of some relevant optimization issues in a number of specific application areas such as scheduling vehicle routing or network optimization The first edition of the Handbook of Heuristics was published in 2018 and contained 47 chapters In this second edition the authors revised 30 of them to include new developments in the area that appeared in the last few years In particular the reader may find 14 chapters in search strategies including a new chapter on deep learning 4 in local search 14 in metaheuristics 5 in analysis and implementations and 24 in applications The inclusion of 14 new chapters makes this second edition even more comprehensive totaling 61 chapters

Data Mining: Foundations and Intelligent Paradigms Dawn E. Holmes,Lakhmi C Jain,2012-01-12 There are many invaluable books available on data mining theory and applications However in compiling a volume titled DATA MINING Foundations and Intelligent Paradigms Volume 3 Medical Health Social Biological and other Applications we wish to introduce some of the latest developments to a broad audience of both specialists and non specialists in this field

Metaheuristics in the Service Industry Martin Josef Geiger,Walter Habenicht,Marc Sevaux,Kenneth Sörensen,2009-05-30 Most developed economics show the tendency of an increasing importance of modern services such as tourism logistical services finance and others In many cases complex optimization problems can be found in this context and the successful operation of modern services often depends on the ability to solve the obtained optimization models Metaheuristics on the other hand present an interesting problem resolution paradigm that has attracted considerable interest in past years The book combines a set of selected and peer reviewed articles presenting novel results of metaheuristics for modern services In particular applications in the area of transportation and logistics are considered while other areas include production and financial services Novel methodological approaches as well as improved results are obtained resulting in a considerable contribution to the state of the art of research in metaheuristics

Evolutionary Computation in Combinatorial Optimization Carlos Cotta,Peter I. Cowling,2009-04-02 This book constitutes the refereed proceedings of the 9th European Conference on Evolutionary Computation in Combinatorial Optimization EvoCOP 2009 held in T bingen Germany in April

2009 The 21 revised full papers presented were carefully reviewed and selected from 53 submissions The papers present the latest research and discuss current developments and applications in metaheuristics a paradigm to effectively solve difficult combinatorial optimization problems appearing in various industrial economical and scientific domains Prominent examples of metaheuristics are evolutionary algorithms simulated annealing tabu search scatter search memetic algorithms variable neighborhood search iterated local search greedy randomized adaptive search procedures estimation of distribution algorithms and ant colony optimization Applications of Evolutionary Computation Juan Luis Jiménez Laredo,J. Ignacio Hidalgo,Kehinde Oluwatoyin Babaagba,2022-04-15 This book constitutes the refereed proceedings of the 25th International Conference on Applications of Evolutionary Computation EvoApplications 2022 held as part of Evo 2022 in April 2022 co located with the Evo 2022 events EuroGP EvoCOP and EvoMUSART The 46 revised full papers presented in this book were carefully reviewed and selected from 67 submissions

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