

Francisco Baptista Pereira
Jorge Tavares (Eds.)

Bio-inspired Algorithms for the Vehicle Routing Problem



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Bio Inspired Algorithms For The Vehicle Routing Problem Studies In Computational Intelligence

**Ortiz Zezzatti, Carlos Alberto
Ochoa, Chira, Camelia, Hernandez,
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Bio Inspired Algorithms For The Vehicle Routing Problem Studies In Computational Intelligence:

Bio-inspired Algorithms for the Vehicle Routing Problem Francisco Baptista Pereira, Jorge Tavares, 2008-09-10 The vehicle routing problem VRP is one of the most famous combinatorial optimization problems In simple terms the goal is to determine a set of routes with overall minimum cost that can satisfy several geographical scattered demands A fleet of vehicles located in one or more depots is available to fulfill the requests A large number of variants exist adding different constraints to the original definition Some examples are related to the number of depots the ordering for visiting the customers or to time windows specifying a desirable period to arrive to a given location The original version of this problem was proposed by Dantzig and Ramser in 1959 In their seminal paper the authors address the calculation of a set of optimal routes for a fleet of gasoline delivery trucks Since then the VRP has attracted the attention of a large number of researchers A considerable part of its success is a consequence of its practical interest as it resembles many real world problems faced everyday by distribution and transportation companies just to mention a few applications areas In this context the development of efficient optimization techniques is crucial They are able to provide new and enhanced solutions to logistic operations and may therefore lead to a substantial reduction in costs for companies Additionally and from a research oriented perspective the VRP is a challenging NP hard problem providing excellent benchmarks to assess the efficiency of new global optimization algorithms

Logistics Management and Optimization through Hybrid Artificial Intelligence Systems Ortiz Zezzatti, Carlos Alberto Ochoa, Chira, Camelia, Hernandez, Arturo, Basurto, Miguel, 2012-03-31 This book offers the latest research within the field of HAIS surveying the broad topics and collecting case studies future directions and cutting edge analyses investigating biologically inspired algorithms such as ant colony optimization and particle swarm optimization

Bio-inspired Algorithms for the Vehicle Routing Problem Francisco Baptista Pereira, Jorge Tavares, 2008-09-29 The vehicle routing problem VRP is one of the most famous combinatorial optimization problems In simple terms the goal is to determine a set of routes with overall minimum cost that can satisfy several geographical scattered demands Biological inspired computation is a field devoted to the development of computational tools modeled after principles that exist in natural systems The adoption of such design principles enables the production of problem solving techniques with enhanced robustness and flexibility able to tackle complex optimization situations The goal of the volume is to present a collection of state of the art contributions describing recent developments concerning the application of bio inspired algorithms to the VRP Over the 9 chapters different algorithmic approaches are considered and a diverse set of problem variants are addressed Some contributions focus on standard benchmarks widely adopted by the research community while others address real world situations

Handbook of Swarm Intelligence Bijaya Ketan Panigrahi, Yuhui Shi, Meng-Hiot Lim, 2011-02-04 From nature we observe swarming behavior in the form of ant colonies bird flocking animal herding honey bees swarming of bacteria and many more It is only in recent years that researchers have taken notice of such natural

swarming systems as culmination of some form of innate collective intelligence albeit swarm intelligence SI a metaphor that inspires a myriad of computational problem solving techniques In computational intelligence swarm like algorithms have been successfully applied to solve many real world problems in engineering and sciences This handbook volume serves as a useful foundational as well as consolidatory state of art collection of articles in the field from various researchers around the globe It has a rich collection of contributions pertaining to the theoretical and empirical study of single and multi objective variants of swarm intelligence based algorithms like particle swarm optimization PSO ant colony optimization ACO bacterial foraging optimization algorithm BFOA honey bee social foraging algorithms and harmony search HS With chapters describing various applications of SI techniques in real world engineering problems this handbook can be a valuable resource for researchers and practitioners giving an in depth flavor of what SI is capable of achieving

Operational Research in Business and Economics Evangelos Grigoroudis, Michael Doumpos, 2016-07-29 This book gathers a selection of refereed papers presented at the 4th International Symposium and 26th National Conference of the Hellenic Operational Research Society It highlights recent scientific advances in operational research and management science OR MS with a focus on linking OR MS with other areas of quantitative methods in a multidisciplinary framework Topics covered include areas such as business process modeling supply chain management organization performance and strategy planning revenue management financial applications production planning metaheuristics logistics inventory systems and energy systems

The Service Routing Problem Nadine Holtvagt, 2011

Computational Intelligence Paradigms for Optimization Problems Using MATLAB®/SIMULINK® S. Sumathi, L. Ashok Kumar, Surekha. P, 2018-09-03 Considered one of the most innovative research directions computational intelligence CI embraces techniques that use global search optimization machine learning approximate reasoning and connectionist systems to develop efficient robust and easy to use solutions amidst multiple decision variables complex constraints and tumultuous environments CI techniques involve a combination of learning adaptation and evolution used for intelligent applications Computational Intelligence Paradigms for Optimization Problems Using MATLAB Simulink explores the performance of CI in terms of knowledge representation adaptability optimality and processing speed for different real world optimization problems Focusing on the practical implementation of CI techniques this book Discusses the role of CI paradigms in engineering applications such as unit commitment and economic load dispatch harmonic reduction load frequency control and automatic voltage regulation job shop scheduling multidepot vehicle routing and digital image watermarking Explains the impact of CI on power systems control systems industrial automation and image processing through the above mentioned applications Shows how to apply CI algorithms to constraint based optimization problems using MATLAB m files and Simulink models Includes experimental analyses and results of test systems Computational Intelligence Paradigms for Optimization Problems Using MATLAB Simulink provides a valuable reference for industry professionals and advanced undergraduate postgraduate and research students

Hybrid Metaheuristics

Christian Blum, Luca Gaspero, Andrea Roli, Michael Sampels, Andrea Schaerf, 2009-10-07 The International Workshop on Hybrid Metaheuristics was established with the aim of providing researchers and scholars with a forum for discussing new ideas and research on metaheuristics and their integration with techniques typical of other fields. The papers accepted for the sixth workshop confirm that such a combination is indeed effective and that several research areas can be put together. Slowly but surely this process has been promoting productive dialogue among researchers with different expertise and eroding barriers between research areas. The papers in this volume give a representative sample of current research in hybrid metaheuristics. It is worth emphasizing that this year a large number of papers demonstrated how metaheuristics can be integrated with integer linear programming and other operations research techniques. Constraint programming is also featured which is a notable representative of artificial intelligence solving methods. Most of these papers are not only a proof of concept which can be valuable by itself but also show that the hybrid techniques presented tackle difficult and relevant problems. In keeping with the tradition of this workshop special care was exercised in the review process: out of 22 submissions received 12 papers were selected on the basis of reviews by the Program Committee members and evaluations by the Program Chairs. Reviews were in great depth; reviewers sought to provide authors with constructive suggestions for improvement. Special thanks are extended to the Program Committee members who devoted their time and effort. Special gratitude is due to Andrea Lodi and Vittorio Maniezzo who both accepted our invitation to give an overview talk.

Urban Transport XIX C. A. Brebbia, 2013-05-01 This book contains the papers presented at the nineteenth annual International Conference on Urban Transport and the Environment. The papers cover research on how to minimise ecological and environmental impacts from urban transportation systems, make them sustainable and use them to improve the socio-economic fabric of the city. Papers also address the concerns about the safety, security and efficiency of the systems. Topics covered include Urban transport planning and Management, Transportation demand analysis, Traffic integration and control, Intelligent transport systems, Transport modelling and simulation, Land use and transport integration, Public transport systems, Environmental and ecological aspects, Air and noise pollution, Safety and security, Energy and transport fuels, Economic and social impact and Advanced transport systems.

Open Problems in Optimization and Data Analysis Panos M. Pardalos, Athanasios Migdalas, 2018-12-04 Computational and theoretical open problems in optimization: computational geometry, data science, logistics, statistics, supply chain modeling and data analysis are examined in this book. Each contribution provides the fundamentals needed to fully comprehend the impact of individual problems. Current theoretical, algorithmic and practical methods used to circumvent each problem are provided to stimulate a new effort towards innovative and efficient solutions. Aimed towards graduate students and researchers in mathematics, optimization, operations research, quantitative logistics, data analysis and statistics, this book provides a broad comprehensive approach to understanding the significance of specific challenging or open problems within each discipline. The contributions contained in

this book are based on lectures focused on Challenges and Open Problems in Optimization and Data Science presented at the Deucalion Summer Institute for Advanced Studies in Optimization Mathematics and Data Science in August 2016

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