Meta Heuristics For Large Scale Process Scheduling

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alger jr in this paper a hybrid meta heuristic is designed and implemented to solve large scale instances ie state or regional problems since there is a lack of algorithms that combine the features of meta heuristics and exact methods to solve np hard meta heuristic methods and their hybrids for large scale complex process scheduling problems

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meta heuristic methods in the process of searching a best or improved method with desired objective all possible solutions are tested one by one this process is viable only for small size of problems but very challenging complicated and time very large scale high algorithm with the help of some efficient meta heuristic algorithms to find better task scheduling solutions for cloud computing systems and reduce the makespan time meta heuristics are well understood meta heuristics have been ...

Meta Heuristics For Large Scale Process Scheduling [PDF]
This paper presents iterated local search and great deluge trajectory metaheuristics for the linear ordering problem (LOP). Both metaheuristics are based on the TREE local search method introduced in Sakuraba and Yagiura (2010) that is the only method ever applied to a set of large-sized instances that are in line with the scale of nowadays real applications.

Metaheuristics for large-scale instances of the linear ...
According to this perspective, short scale construction is a typical optimization problem, such as the well-known knapsack problem ("Choose a set of objects, each having a specific weight and monetary value, so that the value is maximized and the total weight does not exceed a predetermined limit").

Meta-Heuristics in Short Scale Construction: Ant Colony ...
for large-scale projects. The major objective of this thesis is to design and develop new heuristic and meta-heuristic methods to achieve fast and high quality solutions for the large-scale RLP and RCDTCTP. Two different methods are presented in this thesis for the RLP, including a memetic

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Metaheuristics for large-scale instances of the linear ordering problem . By Celso S. Sakuraba, Débora P. Ronconi, Ernesto G. Birgin and Mutsunori Yagiura. Topics: Metaheuristics, iterated local search, great deluge, linear ordering problem ...

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A unified view of metaheuristics This book provides a complete background on metaheuristics and shows readers how to design and implement efficient algorithms to solve complex optimization problems across a diverse range of applications, from networking and bioinformatics to engineering design, routing, and scheduling. It presents the main design questions for all families of metaheuristics ...

Metaheuristics: From Design to Implementation | Wiley
International audienceIn this work a new method based on geometric fractal decomposition to solve large-scale continuous optimization problems is proposed. It consists of dividing the feasible search space into sub-regions with the same geometrical pattern. At each iteration, the most promising ones are selected and further decomposed.

This book's aim is to provide several different kinds of information: a delineation of general metaheuristics methods, a number of state-of-the-art articles from a variety of well-known classical application areas as well as an outlook to modern computational methods in promising new areas. Therefore, this book may equally serve as a textbook in graduate courses for students, as a reference book for people interested in engineering or social sciences, and as a collection of new and promising avenues for researchers working in this field.

Big Data is a new field, with many technological challenges to be understood in order to use it to its full potential. These challenges arise at all stages of working with Big Data, beginning with data generation and acquisition. The storage and management phase presents two critical challenges: infrastructure, for storage and transportation, and conceptual models. Finally, to extract meaning from Big Data requires complex analysis. Here the authors propose using metaheuristics as a solution to these challenges; they are first able to deal with large size problems and secondly flexible and therefore easily adaptable to different types of data and different contexts. The use of metaheuristics to overcome some of these data mining challenges is introduced and justified in the first part of the book, alongside a specific protocol for the performance evaluation of algorithms. An introduction to metaheuristics follows. The second part of the book details a number of data mining tasks, including clustering, association rules, supervised classification and feature selection, before explaining how metaheuristics can be used to deal with them. This book is designed to be self-contained, so that readers can understand all of the concepts discussed within it, and to provide an overview of recent applications of metaheuristics to knowledge discovery problems in the context of Big Data.

A unified view of metaheuristics This book provides a complete background on metaheuristics and shows readers how to design and implement efficient algorithms to solve complex optimization problems across a diverse range of applications, from networking and bioinformatics to engineering design, routing, and scheduling. It presents the main design questions for all families of metaheuristics and clearly illustrates how to implement the algorithms under a software framework to reuse both the design and code. Throughout the book, the key search components of metaheuristics are considered as a toolbox for: Designing efficient metaheuristics (e.g. local search, tabu search, simulated annealing, evolutionary algorithms, particle swarm optimization, scatter search, ant colonies, bee colonies, artificial immune systems) for optimization problems Designing efficient metaheuristics for multi-objective optimization problems Designing hybrid, parallel, and distributed metaheuristics Implementing metaheuristics on sequential and parallel machines Using many case studies and treating design and implementation independently, this book gives readers the skills necessary to solve large-scale optimization problems quickly and efficiently. It is a valuable reference for practicing engineers and researchers from diverse areas dealing with optimization or machine learning; and graduate students in computer science, operations research, control, engineering, business and management, and applied mathematics.

Interested in the Genetic Algorithm? Simulated Annealing? Ant Colony Optimization? Essentials of Metaheuristics covers these and other metaheuristics algorithms, and is intended for undergraduate students, programmers, and non-experts. The book covers a wide range of algorithms, representations, selection and modification operators, and related topics, and includes 71 figures and 135 algorithms great and small. Algorithms include: Gradient Ascent techniques, Hill-Climbing variants, Simulated Annealing, Tabu Search variants, Iterated Local Search, Evolution Strategies, the Genetic Algorithm, the Steady-State Genetic Algorithm, Differential Evolution, Particle Swarm Optimization, Genetic Programming variants, One- and Two-Population Competitive Coevolution, N-Population Cooperative Coevolution, Implicit Fitness Sharing, Deterministic Crowding, NSGA-II, SPEA2, GRASP, Ant Colony Optimization variants, Guided Local Search, LEM, PBIL, UMDA, cGA, BOA, SAMUEL, ZCS, XCS, and XCSF.

One of the most challenging issues in modelling today's large-scale computational systems is to effectively manage highly parametrised distributed environments such as computational grids, clouds, ad hoc networks and P2P networks. Next-generation computational grids must provide a wide range of services and high performance computing infrastructures. Various types of information and data processed in the large-scale dynamic grid environment may be incomplete, imprecise, and fragmented, which complicates the specification of proper evaluation criteria and which affects both the availability of resources and the final collective decisions of users. The complexity of grid architectures and grid management may also contribute towards higher energy consumption. All of these issues necessitate the development of intelligent resource management techniques, which are capable of capturing all of this complexity and optimising meaningful metrics for a wide range of grid applications. This book covers hot topics in the design, administration and management of dynamic grid environments with a special emphasis on the preferences and autonomous decisions of system users, secure access to the processed data and services, and application of green technologies. It features advanced research related to scalable genetic-based heuristic approaches to grid scheduling, whereby new scheduling criteria, such as system reliability, security, and energy consumption are incorporated into a general scheduling model. This book may be a valuable reference for students, researchers, and practitioners who work on – or who are interested in joining -- interdisciplinary research efforts in the areas of distributed and evolutionary computation.

Optimization techniques have developed into a significant area concerning industrial, economics, business, and financial systems. With the development of engineering and financial systems, modern optimization has played an important role in service-centered operations and as such has attracted more attention to this field. Meta-heuristic hybrid optimization is a newly development mathematical framework based optimization technique. Designed by logicians, engineers, analysts, and many more, this technique aims to study the complexity of algorithms and problems. Meta-Heuristics Optimization Algorithms in Engineering, Business, Economics, and Finance explores the emerging study of meta-heuristics optimization algorithms and methods and their role in innovated real world practical applications. This book is a collection of research on the areas of meta-heuristics optimization algorithms in engineering, business, economics, and finance and aims to be a comprehensive reference for decision makers, managers, engineers, researchers, scientists, financiers, and economists as well as industrialists.

This book constitutes the thoroughly refereed post-conference proceedings of the 9th International Conference on Large-Scale Scientific Computations, LSSC 2013, held in Sozopol, Bulgaria, in June 2013. The 74 revised full papers presented together with 5 plenary and invited papers were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on numerical modeling of fluids and structures; control and uncertain systems; Monte Carlo methods: theory, applications and distributed computing; theoretical and algorithmic advances in transport problems; applications of metaheuristics to large-scale problems; modeling and numerical simulation of processes in highly heterogeneous media; large-scale models: numerical methods, parallel computations and applications; numerical solvers on many-core systems; cloud and grid computing for resource-intensive scientific applications.

This research investigates the development of an effective heuristic to solve large-scale Set Covering Problems (SCP) by applying the meta-heuristic Meta-RaPS (Meta-heuristic for Randomized Priority Search). In Meta-RaPS, a feasible solution is generated by introducing random factors into a construction method. Then the feasible solutions can be improved by an improvement heuristic. In addition to applying the basic Meta-RaPS, the heuristic developed herein for SCP integrates the elements of randomizing the selection of priority rules, penalizing the worst columns when the searching space is highly condensed, and defining the core problem to speedup the algorithm. This heuristic has been tested on 80 SCP instances from the OR-Library. The sizes of the problems are up to 1,000 rows x 10,000 columns for non-unicost SCP, and 28,160 rows x 11,264 columns for the unicost SCP. This heuristic is only one of two known SCP heuristics to find all optimal/best known solutions for those non-unicost instances. In addition, this heuristic is the best for unicost problems among the approximation heuristics in terms of solution quality. Furthermore, evolving from a simple greedy heuristic, it is fast, simple and easy to code. This heuristic enriches the

options of practitioners in the optimization area.

This book provides a complete background on metaheuristics to solve complex bi-level optimization problems (continuous/discrete, mono-objective/multi-objective) in a diverse range of application domains. Readers learn to solve large scale bi-level optimization problems by efficiently combining metaheuristics with complementary metaheuristics and mathematical programming approaches. Numerous real-world examples of problems demonstrate how metaheuristics are applied in such fields as networks, logistics and transportation, engineering design, finance and security.

The book presents eight well-known and often used algorithms besides nine newly developed algorithms by the first author and his students in a practical implementation framework. Matlab codes and some benchmark structural optimization problems are provided. The aim is to provide an efficient context for experienced researchers or readers not familiar with theory, applications and computational developments of the considered metaheuristics. The information will also be of interest to readers interested in application of metaheuristics for hard optimization, comparing conceptually different metaheuristics and designing new metaheuristics.