■ TC15

C - Room 15, Level 4

Computer Science-Applications to OR I

Contributed Session

Chair: Clara Novoa, Assistant Professor, Texas State University, 601 University Dr, San Marcos, TX, 78666, United States of America, cn17@txstate.edu

1 - Search Tree Restructuring

Erik Zawadzki, PhD Student, Carnegie Mellon University, 5000 Forbes Ave, Pittsburgh, PA, 15213, United States of America, epz@cs.cmu.edu, Tuomas Sandholm

Poor branching decisions in search can increase solve time by orders of magnitude. We introduce an approach where, instead of committing to the tree so far, we restructure the tree throughout the search. We define two tree-modifying operators and show that conflict-directed backtracking (CDBT) can be expressed as a compound operation. CDBT is, however, only one of many compound tree operations. We study more aggressive compound operations and present experiments on graph coloring and 3SAT.

2 - A New Heuristic Algorithm for the Non-unique Probe Selection Problem

Elisa Pappalardo, Department of Mathematics and Computer Science, University of Catania, Viale Andrea Doria, 6, Catania, Italy, epappalardo@dmi.unict.it, Beyza Ahlatcioglu Ozkok, Panos Pardalos

The identification of biological agents in a sample is an important problem arising in medicine. In this talk we introduce a new model and heuristic for the Non-unique probe selection problem. This model consists of selecting optimal oligonucleotide probe sets for use in hybridization experiments in which target viruses or bacteria are to be identified in biological samples. Furthermore, the feasible solution is produced for large, real data sets.

3 - An Infinite Hidden-Markov Model for Multiple Change Point Estimation

Chandan Reddy, Assistant Professor, Wayne State University, 5143 Cass Avenue, 452 State Hall, Detroit, MI, 48084, United States of America, reddy@cs.wayne.edu, Adel Alaeddini, Kai Yang

Despite their capability in monitoring the variability of processes, control charts are not effective tools for identifying process change points. In this paper, we develop an infinite hidden Markov model (HMM) with parameters estimated using Dirichlet process (DP) and Markov Chain Monte Carlo (MCMC) for identifying multiple change-points in different types of processes. We also use extensive simulation studies to study the performance of the proposed method.

4 - Parallel Knapsack Algorithms on Multicore Architectures

Clara Novoa, Assistant Professor, Texas State University, 601 University Dr, San Marcos, TX, 78666, United States of America, cn17@txstate.edu, Apan Qasem, Hammad Rashid

This work investigates the scalability of two parallel implementations of dynamic programming recursions for the integral knapsack problem on multicore architectures. The study also identifies a tunable parameter which can be used to enhance speedup.

■ TC16

C - Room 16A, Level 4

Scheduling II

Contributed Session

Chair: Jeffrey Schaller, Professor, Eastern Connecticut State University, 83 Windham St., Department of Business Administration, Willimantic, CT, 06226, United States of America, schallerj@easternct.edu

1 - Scheduling in Bicriteria Stochastic Single Machine Systems

Hossein Soroush, Professor, Kuwait University, P.O. Box 5969, Department of Stat. & OR, Safat, 13060, Kuwait, h.soroush@ku.edu.kw, Talal Al-Khamis

We study a bi-criteria single machine scheduling problem with stochastic job attributes. The objective is to find an optimal sequence that minimizes the expected value of a nonlinear function of two performance criteria. The problem is NP-hard; however, special cases are solvable exactly when there are some conditions on the cost functions and the criteria. Computational results are reported to show the performance of the proposed solution strategies.

2 - An LP Based General Method for Job Shop Scheduling with Intermediate Inventory Holding Costs

Phil Kaminsky, University of California Berkeley, IEOR, Berkeley, CA, 94720, United States of America, kaminsky@ieor.berkeley.edu, Kerem Bulbul

We present a shifting bottleneck heuristic for job shop scheduling problems with intermediate holding costs. We utilize information from the LP formulation of the associated timing problem to solve sub-problems, and can be used for any objective function whose associated timing problem can be expressed as a linear program. Computationally, this approach performs as well or better than specialized algorithms for specific objective functions that have appeared previously in the literature.

3 - Minimizing Sequence-dependent Setup Costs in Feeding Batch Processes Under Due Date Restrictions

Stefan Bock, Professor, University of Wuppertal, Gauflstrafle 20, Wuppertal, 42097, Germany, sbock@winfor.de, Kathrin Klamroth

We address the minimization of sequence-dependent setup costs in feeding batch processes. Since these processes supply subsequent stages, due dates have to be guaranteed. Besides analyzing the complexity status of the problem, we propose new Branch\ &Bound algorithms. By making use of new dominance rules, problem instances of large sizes can be solved to optimality. Moreover, a Tabu Search procedure is introduced. The efficiency of the approaches is validated by computational experiments.

4 - Parallel Machine Scheduling Problem

Mona Asudegi, PhD Student, University of Maryland, 1173 G, Glenn Martin Hall, College Park, 20740, United States of America, asudegi@umd.edu, Ali Haghani

Parallel machine scheduling is a well known problem in optimization area. Though this problem is NP hard, but the structure of formulation may help solving the problem easier. In this study a new formulation is proposed for construction machine scheduling and the approach for solving it is discussed.

5 - Scheduling Jobs in a Permutation Flowshop to Minimize Total Earliness and Tardiness

Jeffrey Schaller, Professor, Eastern Connecticut State University, 83 Windham St., Department of Business Administration, Willimantic, CT, 06226, United States of America, schallerj@easternct.edu, Jorge Valente

This paper considers the problem of scheduling jobs in a permutation flow shop with the objective of minimizing total earliness and tardiness. Procedures are described and results of tests on various problem sets are reported.

■ TC17

C - Room 16B, Level 4

Logistics and SCM in India

Cluster: OR/MS in India

Invited Session

Chair: N Viswanadham, Professor, Indian School of Business, Gachibowli, Hyderabad, AP, 500032, India, n_viswanadham@isb.edu

1 - Sourcing Strategies in the Presence of Low Cost Suppliers in a Supply Base

B Mahadevan, Professor, Indian Institute of Management Bangalore, Bannerghatta Road, Bangalore, 560076, India, mahadev@IIMB.ERNET.IN, Jishnu Hazra

Economies such as India offer value propositions of low cost of products requiring sourcing strategies that address cost-heterogeneous supply base. In this paper we address the buyer's decisions pertaining to "how much capacity to reserve" and "from how many suppliers" while sourcing from a cost heterogeneous supply base. We derive suppliers' capacity reservation price. We develop solutions that are robust to the number of suppliers from whom capacity is procured through reservation.

2 - Automated Railway Investment Analysis using Line Capacity Simulator

Hari Prasad, Manager, Analytics, Delta Partners Media Arab Emirates, hari.prasadh@gmail.com, hari.uday@gmail.com

In this paper, we present an automated business intelligence tool to aid operational and infrastructural decision making for short term , mid term and long term railway investments.It is based on innovative simulation techniques modeling all the major parameters of traffic flow which are the section details,including location of stations and block signals, number of tracks, track characteristics by way of speed limits and curvatures, speed restrictions and gradients and train characteristics , for both timetabled and un-timetabled operations. The full extent of section investments in capacity is possible through the detailed simulator analysis, i.e. number of tracks, block sections (through stations, intermediate blocks and automatic signaling at any inter-signal distance), relaxing speed restrictions, smoothening gradients and train running options (longer trains, faster trains). The simulation output can be further used for traffic planning, time-tabling, maintenance planning and operational analysis.