5 - An Application to Improve the Efficiency of a Paced Assembly Line for Aircrafts
Sue Abdinnour, Professor, Wichita State University, 1845 Fairmont, Barton School of Business, Wichita, KS 67226, United States of America, sue.abdinnour@wichita.edu

The application helps managers monitor a large number of tasks that are required to build an aircraft on a paced assembly line. Task information (time, predecessors, successors, etc.) is stored in a database. A web interface is designed to work seamlessly with the database by sending query requests. Similarly, it works with a spreadsheet to run critical path analysis for a group of tasks at a workstation. The application generates reports that help manage the assembly line and improve its efficiency.

■ SB19
Aula 383- Third Floor
Public Transport
Cluster: Logistics, Vehicle Routing and Location
Invited Session
Chair: Jenny Leung, Professor, Chinese University of Hong Kong, Dept. of Systems Engineering, Shatin, NT, Hong Kong - FRC. jenny@se.cuhk.edu.hk

1 - On Designing Connected Rapid Transit Networks Reducing the Number of Transfers
Laureano Escudero, Professor, Universidad Rey Juan Carlos, Dpto. de Estadística e Invest. Operativa, Madrid, Spain. laureano.escudero@urjc.es, Susana Muñoz

In this work we deal with a modification of the well-known extended rapid transit network design problem. On one side, we propose an integer programming model for selecting the trains to be constructed and the links between them, in such a way that a connected rapid transit network is obtained. On the other side, we present a greedy heuristic procedure which attempts to minimize an estimation of the total number of transfers that should be done by the users to arrive at their destinations.

2 - A Math Programming Approach for Selecting Attractive Express Services on a BRT with Capacity Constraints
Ricardo Giesen, Assistant Professor, Pontificia Universidad Católica de Chile, Departamento de Ingeniería de Transporte, Víctor Mackenna 4860, Macul, Santiago, Chile, giesen@ing.puc.cl, Homero Larrain, Juan Carlos Munoz

A mathematical programming based model for obtaining the best express services on a high-demand transit corridor is proposed. A solution method for the non-linear integer formulation is developed. Finally the model is applied to determine which scenarios (demand characteristics, operation issues and corridor topology) make express services more attractive.

3 - Game Theoretic Models for Competition in Public Transit Services
Janny Leung, Professor, Chinese University of Hong Kong, Dept. of Systems Engineering, Shatin, NT, Hong Kong - FRC. janny@se.cuhk.edu.hk

As metropolitan areas grow, commuting needs increase and the burden on public transport systems, leading to traffic congestion and pollution. We model the competitive situation when several service providers offer public transit services using potential games, and discuss mathematical programmes for ensuring Nash equilibria. We investigate the relative merits and tradeoffs for different structures of transit networks, and the interplay between the services offered and system ridership.

■ SB20
Aula 382- Third Floor
Cutting and Packing
Contributed Session
Chair: Antonio Carlos Moretti, Universidade Estadual de Campinas, Sírgio Buarque de Holanda 651, Campinas, SP, 13083-859, Brazil, moretti@ime.unicamp.br

1 - Solving the Cutting Stock Problem with a New Simplex Method Updating Procedure
Daniela Cantante, UNICAMP, R. Maria Bicego, 125 - Vila Santa Isabel, R. Sérgio Buarque de Holanda,651, Campinas, SP, 13083-859, Brazil. dcantante@gmail.com, Carla Ghidini, Aurelio Oliveira, Christiano Lyra Filho

The objective of this work is to apply efficient Simplex basis LU factorization update techniques to improve the performance of the Simplex method used to solve cutting stock problems. Only the factored columns actually modified by the change of the basis are carried through. The matrix columns are reordered according to a specific given strategy. The proposed method achieves a reduction of the computational time in the solution of the cutting stock problems compared with the GLPK.

2 - Integer-linear Formulation for the DAGs-packing Problem
Rubia Santos, DMT-UFMS, Cidade Universitária S/N, Caixa Postal 549, Campo Grande, MS, 79070900, Brazil, rubia@dmt.ufms.br, Rodolfo Arvedo, Ricardo Santos

In this work we present the DAGs-Packing Problem and its impact on the compiler and processor design areas. We propose an ILP formulation based on the Strip Packing Program and we implement a set of heuristics to solve the problem. In our formulation, DAGs are items to be packed and the set of processing elements is the strip. We compare our solution to three other heuristic algorithms for the same problem. The results show that our algorithm outperforms other heuristics in 80% of the instances.

3 - On the 2D Cutting Stock Problem with Variable Dimensions via Column Generation
Mauricio A. Ramirez, Universidad de Los Andes, Departamento de Ingeniería Industrial, Cra 1 Este 19A-40, Bogotá, Colombia, adro-rami@unal.edu.co, Andrés L. Medaglia, Jorge E. Mendoza

The two-dimensional cutting stock problem with multiple stock sizes (2D MSSCP) decides how to cut a set of small objects from a set of larger ones of different sizes. While approaches have been proposed for the case in which the dimensions of the large objects are fixed, research is rather scarce on variants with variable dimension (2D MSSCP-V). We propose a method based on column generation to solve the 2D MSSCP-V and report our results using data from a cardboard box printing company.

4 - A Bi-object Cutting Stock Problem with Open Stacks
Antonio Carlos Moretti, Universidade Estadual de Campinas, Sérgio Buarque de Holanda 651, Campinas, SP, 13083-859, Brazil, moretti@ime.unicamp.br, Rodrigo Rabello Golfeiro, Luiz Leduino Salles Neto

In this work we implemented a genetic algorithm with a symbiotic relationship among different populations representing solutions and cutting patterns to minimize the number of processed objects and setup number given a fixed number of open stacks.

Sunday, 2:30pm - 4:00pm

■ SC01
Aula Magna- First Floor
Tutorial: Metaheuristics for Multi-objective Optimization
Cluster: Tutorials
Invited Session
Chair: El-Ghazali Talbi, University of Lille - INRIA - CNRS, France, Elghazali.Talbi@lifl.fr

1 - Metaheuristics for Multi-objective Optimization
El-Ghazali Talbi, University of Lille - INRIA - CNRS, France, Elghazali.Talbi@lifl.fr

This tutorial presents an overview of metaheuristics for multi-objective optimization. A substantial number of metaheuristics for multi-objective problem solving has been proposed so far, and an attempt of unifying existing approaches here presented. Based on a fine-grained decomposition and following the main issues of fitness assignment, diversity preservation and elitism, a conceptual global model is proposed and is validated by regarding a number of state-of-the-art algorithms as simple variants of the same structure. The presented model is then incorporated into a general-purpose software framework dedicated to the design and the implementation of evolutionary multi-objective optimization techniques. ParadisEO-MOEO. This package has proven its validity and flexibility by enabling the resolution of many real-world and hard multi-objective optimization problems.