

3 - Linked-Tabu Searches for a Bi-Objective Routing Problem: An Application to School Transportation in Rural Areas

Joaquín Pacheco, Applied Economy, University of Burgos, Plaza Infanta Elena s/n, 09001, Burgos, Spain, jpacheco@ubu.es, Manuel Laguna

This work addresses a variant of the VRP with two objectives: minimizing the duration of the longest route and minimizing the total distance. The trade-off in this problem is between service level, which is represented by the first objective, and the operational cost, represented by the second one. We apply this model to real problems in the context of school transportation in rural areas. A strategy based in linking tabu search procedures is proposed for approximating the efficient frontier. This strategy is shown to be effective when compared to ad-hoc solutions used in practice

4 - A metaheuristic for solving large instances of the School Bus Routing Problem

Patrick Schittekat, Faculty of Applied Economics, University of Antwerp, Prinsstraat 13, 2000, Antwerp, patrick.schittekat@ua.ac.be, Kenneth Sörensen, Marc Sevaux, Johan Springael

The school bus routing problem discussed in this paper, is similar to the standard vehicle routing problem, but has several interesting additional features. In the standard VRP all stops to visit are given. In our school bus routing problem, we assume that a set of potential stops is given, as well as a set of students that can walk to one or more stops. The goal of this routing problem is to select a subset of stops that will actually be visited by the buses, determine which stop each student should walk to and develop a set of tours that minimize the total distance traveled by all buses.

■ TE-29

Tuesday, 17:00-18:30

Room RB 103

Metaheuristics VII

Stream: Metaheuristics (c)

Contributed session

Chair: Jorge Pereira, INESC Porto / FEP.UP, Campus da FEUP, Rua Dr. Roberto Frias, 378, 4200-465, Porto, Portugal, jpereira@inescporto.pt

1 - Variable Neighbourhood Search Metaheuristic for Colour Image Thresholding

Jasmina Lazic, Mathematical Institute (SANU), Belgrade, Serbia, jasminal@mi.sanu.ac.yu, Nenad Mladenovic, Milan Tuba

Image thresholding is a process of identifying the foreground and the background part of a given digital image by partitioning the set of pixels into two groups according to some criteria. In this paper we propose a new colour image thresholding algorithm, based on the Variable Neighbourhood Search metaheuristic for data clustering. This algorithm does not require any a priori knowledge about the input image and uses both the colour and the spatial information. It has comparable results to other thresholding algorithms regarding the numerical error, visual quality and running time performance.

2 - Using a genetic algorithm for many-to-many distribution system design problem

Michal Kohani, Univerzita 1, 01026, Zilina, Slovakia, kohani@frdsa.fri.utc.sk

Many-to-many distribution system is a special case of transportation system, where flows of goods from primary sources to customers are concentrated in terminals to create a bigger flow between terminals. This model belongs to discrete quadratic programmes and the optimal solution cannot be found because of time purposes. First method for solving the problem reformulates the model to the form of linear programming problem to be able to use algorithms for integer programming. Second method is to use a metaheuristic method to solve the problem. Genetic algorithm seems to be good for this purpose

3 - Plant Layout Problem Considering L-Shaped Departments

R. Aykut Arapoglu, Industrial Engineering, Eskisehir Osmangazi University, Bademlik Campus, 26030, Eskisehir, Turkey, arapoglu@ogu.edu.tr, Beytullah Ulusoy

The plant layout problem has attracted considerable attention since Armour and Buffa's pioneering work in 1963. It is widely assumed that the departments were rectangular in shape. In this talk, we propose a genetic algorithm based heuristic approach to the plant layout problem with unequal department areas allowing L-shaped departments. The procedure is applied to test problems with different sizes taken from the literature and the results are compared with previous work.

4 - Unit Commitment Including Economic Dispatch with Network Constraints

Jorge Pereira, INESC Porto / FEP.UP, Campus da FEUP, Rua Dr. Roberto Frias, 378, 4200-465, Porto, Portugal, jpereira@inescporto.pt, Bogdan George Lucus, Ana Viana, Manuel Matos

In this paper it is presented the development of an algorithm to solve two complex power systems problems at once. The algorithm carry out two steps: solve the Unit Commitment problem using a meta-heuristic with Constraint Oriented Neighborhoods and promote the base to the Economic Dispatch problem, which consists on the optimization of operating costs under the general constraints to the power system, which is solved through the use of linear programming. The algorithm was applied with success to the Mozambique electric power system, achieving good results and less execution timing consuming.

■ TE-30

Tuesday, 17:00-18:30

Room RB 209

AHP Applications IV

Stream: Analytic Hierarchy Process, Analytic Network Process

Invited session

Chair: Masatsugu Tsuji, Graduate School of Applied Informatics, University of Hyogo, 1-3-3, Higashi-Kawasaki-cho, Chuou-ku, 650-0044, Kobe, Hyogo, Japan, tsuji@ai.u-hyogo.ac.jp

1 - Prioritization and Decision Making Tool for Buildings in an Inventory for Retrofit Implementation

Asli Pelin Gurgun, Sidera Consulting, Ayazmaderesi cad. Saral Is Merkezi 5/1 Gayrettepe, 34349, Istanbul, Turkey, pelin.gurgun@sidera.com.tr, Kemal B. Hanoglu

Retrofitting is a technique to strengthen structures subjected to seismic risks which are not meeting earthquake design code requirements. Prioritization of buildings among a group of similar structures is important in planning the implementation of retrofit activities with limited resources. In this study, it is aimed to develop a prioritization tool with a systematic decision making method indicating the risk factors of retrofitting by using Analytical Hierarchy Process, which can also be used as a simple guideline to understand the basics of a retrofit decision.

2 - Some notes on the Aggregation of Individual Preference Structures in AHP-Group Decision Making

María Teresa Escobar, Grupo Decisión Multicriterio Zaragoza, Universidad de Zaragoza, Gran Vía, 2-4, 50005, Zaragoza, Spain, mescobar@unizar.es, José María Moreno-jimenez

The Aggregation of Individual Preference Structures is an aggregation procedure proposed for AHP-GDM which incorporates some ideas similar to Borda count methods. It allows us to capture the richness of uncertainty; the vision of each decision maker; the interdependencies between the alternatives and the intensities of preferences. This paper analyses some outstanding aspects of this synthesis procedure, such as the analytical study of its mathematical properties within the social choice theory, as well as its exploitation for voting systems and its potential use in negotiation processes.