

3 - A DEA based approach for solving the multiple objective shortest path problem

Alireza Davoodi, Mathematics, Islamic Azad University, Neyshabur Branch, —, Neyshabur, Khorasan, Iran, Islamic Republic Of, alirzd@yahoo.com

Finding the shortest path in a network is one of the important and interesting subjects in network flow problems. When each arc has just one type of cost, there exist some simple methods to find the shortest path. But if there are more than one type of cost (vector of cost), the non-dominated path plays the role of the best path. In this case a Multiple Objective problem is created to find the non-dominated path. In this paper a DEA based approach is introduced to find the non-dominated path(s) in a multiple cost network. This method can determine all efficient paths and the best one.

4 - Fractional regression models for second stage DEA efficiency analyses

Esmeralda Ramalho, Economics, Universidade de Evora, Largo dos Colegiais, 2, 7000-803, EVORA, Portugal, ela@uevora.pt, Joaquim Ramalho, Pedro Henriques

Data envelopment analysis (DEA) is commonly used to measure the relative efficiency of decision-making units. Often, in a second stage, a regression model is estimated to relate DEA efficiency scores to exogenous factors. In this paper, we argue that the traditional linear or tobit approaches to second-stage DEA analysis do not constitute a reasonable data-generating process for DEA scores. Under the assumption that DEA scores can be treated as descriptive measures of the relative performance of units in the sample, we show that using fractional regression models are the most natural way of modeling bounded, proportional response variables such as DEA scores. We also propose generalizations of these models and, given that DEA scores take frequently the value of unity, examine the use of two-part models in this framework. Several tests suitable for assessing the specification of each alternative model are also discussed.

■ MB-07

Monday, 10:40-12h00
8.2.47

New Achievement in Mathematical Programming

Stream: Mathematical Programming [c]
Contributed session

Chair: Gerhard-Wilhelm Weber, Institute of Applied Mathematics, Middle East Technical University, ODTÜ, 06531, Ankara, Turkey, gweber@metu.edu.tr

Chair: Domingos Cardoso, Departamento de Matematica, Universidade de Aveiro, Campus Universitario de Santiago, 3810-193, Aveiro, Portugal, dcardoso@ua.pt

1 - Algorithmic strategies for the recognition of graphs with convex quadratic stability number

Maria F Pacheco, Instituto Politécnico de Bragança - ESTiG, Quinta de Santa Apolónia, Gab. 112, 5301-857, Bragança, Portugal, pacheco@ipb.pt, Domingos Cardoso, Carlos J. Luz

A major difficulty in the recognition of graphs with convex quadratic stability number is the existence of adverse subgraph(s) (subgraph such that the smallest eigenvalue of its adjacency matrix doesn't change when a (neighbourhood of) any vertex is deleted). It is a challenge to find adverse graphs without convex quadratic stability number. We present the main results about graphs with convex quadratic stability number and conclusions about the existence of adverse subgraphs belonging to this family in certain classes of graphs.

2 - A new hybrid cryptosystem based on the satisfiability problem

Sadek Bouroubi, Faculty of Mathematics, Dept of Operations research, USTHB University, Laboratory LAID3, BP32 Bab Ezzouar 16111, 16111, Algiers, Algeria, bouroubis@yahoo.fr

With the development of the mathematical methods which ensure safe electronic communication, more sophisticated techniques emerged which allow to attack codes on increasingly powerful computers. Modern cryptosystems are based on number theory, commutative group theory, or algebraic geometry. This paper presents a simple hybrid cryptosystem whose security is based upon the satisfiability problem well known NP-complete. Its execution is finally illustrated by an example to understand better how it processes.

3 - A two-phase heuristic for the K Clusters with Fixed Cardinality Problem

Lídia Lourenço, Dept. de Matemática, Centro de Investigação Operacional, FCT - Universidade Nova de Lisboa, Monte de Caparica, 2829-516, Caparica, Portugal, ll@fct.unl.pt, Margarida Pato, Graça Gonçalves

Given an undirected graph, the K Clusters with Fixed Cardinality Problem consists of finding K subsets of nodes with fixed cardinality maximising the total similarity of nodes in the same cluster. We propose a two-phase heuristic procedure designed to obtain a feasible solution for this NP-hard problem. First a greedy rule is used to build a solution which is improved in the next phase by an exchange-based heuristic. A computational experiment is designed to evaluate the performance of this heuristic.

4 - A combinatorial approach to assess the separability of clusters

M. Joao Martins, Dep. Matematica, Inst. Superior Agronomia, Tapada da Ajuda, 1349-017, Lisboa, Portugal, mjmartins@isa.utl.pt, J. Orestes Cerdeira, Pedro C. Silva

Given a set of entities, to what extent a particular subset is separated from the other entities? This is a common question that arises in different relevant areas. We propose to assess the separability of a set of entities X based on the following notion of intrusion associated to some aggregation criterion. An entity y is a k-intruder if every (k+1)-partition where y is singleton is not an optimal (k+1)-partition of X U y. We study the optimization problems resulting from different aggregation criteria, and develop this approach further to evaluate the overall separability of a partition.

■ MB-08

Monday, 10:40-12h00
6.1.36

Scheduling at Container Terminals

Stream: Project Management and Scheduling
Invited session

Chair: Florian Jaehn, Business Administration, Management Information Science, Hoelderlinstrasse 3, 57068, Siegen, Germany, florian.jaehn@uni-siegen.de

1 - Positioning freight trains in rail container terminals

Malte Fliedner, Wirtschaftswissenschaftliche Fakultät, Friedrich-Schiller-Universität Jena, Carl-Zeiss-Strasse 3, 07743, Jena, Thuringen, Germany, malte.fliedner@uni-jena.de, Nils Boysen

Modern rail container terminals are an essential node of intermodal transportation networks. In such a terminal, several gantry cranes transship containers simultaneously from incoming trains to their designated destinations on the yard. In this work, we investigate the decision problem of positioning freight trains on the tracks of a terminal in order to balance workload among gantry cranes. We propose mathematical formulations of the core decision problem, provide complexity results and develop heuristic and exact algorithms to solve the problem and several extensions.

2 - Parking Freight Trains in Rail-Rail Transshipment Yards: The Train Location Problem

Nils Boysen, Lehrstuhl für ABWL/ Operations Management, Friedrich-Schiller-Universität Jena, Carl-Zeiß-Str. 3, 07743, Jena, Germany, nils.boysen@uni-jena.de, Malte Fliedner

In modern rail-rail transshipment yards huge gantry cranes spanning all railway tracks allow for an efficient consolidation of containers among freight trains. An important decision problem during daily operations is the train location problem, which assigns each train to a railway track (vertical position) and decides on each train's parking position on the track (horizontal position), so that the train processing time is minimized. For this problem different solution procedures are described and tested in a comprehensive computational study.

3 - Truck Scheduling Problem in Intermodal Container Transportation

Jenny Nossack, Management Information Sciences, University of Siegen, Hölderlinstraße 3, 57068, Siegen, North