Strategic terminal allocation and time scheduling of cyclically arriving container vessels

■ MD-11

Monday, 2:00 PM - 3:30 PM
Convention Centre: Committee Room 2

Resource Scheduling and Dispatching in Container Ports

Stream: Container Ports

Invited session

Chair: *Loo Hay Lee*, Industrial and Systems Engineering, National University of Singapore, Singapore, iseleelh@nus.edu.sg

1 - Strategic terminal allocation and time scheduling of cyclically arriving container vessels

Maarten P.M. Hendriks, Department of Mechanical Engineering, Eindhoven University of Technology , Den Dolech 2, P.O. Box 5123, 5600 MB , Eindhoven, Netherlands, M.P.M.Hendriks@tue.nl, *Jan Tijmen Udding*

We present an MILP formulation to construct a strategic, cyclic terminal allocation and time scheduling for a set of container vessels, which are processed by a multi-terminal port operator. Our case study is about balancing the workload over time, minimizing inter-terminal transport and minimizing deviations from the existing time schedule.

2 - Scheduling of quay cranes in container terminals

Christian Bierwirth, Martin-Luther-University Halle-Wittenberg, 06108, Halle, Germany, christian.bierwirth@wiwi.uni-halle.de, *Frank Meisel*

We consider the scheduling of quay cranes used in container terminals. A new set of constraints is presented to avoid the crane interference problem. A Branch-and-Bound based heuristic is proposed to search a subset of above average quality schedules. For a widely accepted benchmark suite, the new heuristic produces much better solutions in considerably shorter run times than other algorithms known from the literature.

3 - An implementation of prioritized path planning for a large fleet of autonomous straddle carriers

Haye Lau, Faculty of Engineering, University of Technology, Sydney, PO Box 123, 2007, Broadway, NSW, Australia, hlau@eng.uts.edu.au, *Tim Pratley*, *Dikai Liu*, *Shoudong Huang*, *Daniel Pagac*

The productivity of automated vehicles in congested container terminals can be best realised when individual vehicles can freely move in any allowable direction as appropriate at the time. This however complicates the coordination required between the vehicles. We discuss some results from an implementation of prioritized path planning in a bi-directional network for a large fleet of autonomous straddle carriers in a fully automated terminal in Australia.

4 - Vehicle disptaching for transshipment hub operations

Loo Hay Lee, Industrial and Systems Engineering, National University of Singapore, Singapore, iseleelh@nus.edu.sg

In this talk, we present a problem which is motivated by a transshipment container hub operation. We aim at determining the fleet size as well as the vehicle dispatching by considering both the quay crane and yard crane operation constraints. We formulate the problem as a MIP model, and develop efficient approaches to tackle the problem.

■ MD-12

Monday, 2:00 PM - 3:30 PM
Convention Centre: Committee Room 4

Finance: Financial modelling

Stream: Finance

Invited session

Chair: *Galina Andreeva*, Management School & Economics, University of Edinburgh, 50 George Sq, EH8 9JY, Edinburgh , United Kingdom, Galina.Andreeva@ed.ac.uk

1 - Modelling the collection process for unsecured consumer loans

Lyn Thomas, University of Southampton, United Kingdom, l.thomas@soton.ac.uk, *Anna Matuszyk*, *Adiel de Almeida Filho*, *Christophe Mues*

The Basel accord highlights the need to model the collection process so as to estimate LGD. This paper describes how the recovery rate on unsecured consumer debt is affected by the actions of the collector and the circumstances of the defaulter. It models the collections process at a strategic level by a decision tree , while at the operational level it can be modelled as a stochastic dynamic programming problem. The properties of the optimal operational collection strategy are developed including which actions to take and how long to perform them for so as to minimise loss given default

2 - A new system of multivariate distributions: fitting models to financial data

Alexander Belgorodskiy, Salford Business School, The University of Salford, Salford, Greater Manchester , M5 4WT, Salford, alexanderbelgorodskiy@yahoo.com, *Rose Baker*

Baker (2008) uses an order statistics based approach to derive a new class of multivariate distributions with fixed marginal distributions of which Farlie-Gumbel-Morgenstern distribution is a special case. We fit these distributions to high-dimensional financial return data. There are plenty of models to choose from since the form of the distribution depends on the choice of marginals. A number of goodness of fit tests can be used then to determine whether these distributions provide a good description of a population as compared to other multivariate distributions.

3 - Financial model to efficient water allocation between the municipal and agricultural sectors

Zilla Sinuany-Stern, Industrial Engineering and Management, College of Judea and Samaria, College of Judea and Samaria, 44837, Ariel, Israel, zilla@bgu.ac.il, *Erez Braude*, *Gideon Oron*

In this study, financial models were used to present, analyze and solve existing problems in water economies that experience a water shortage. We found a strong similarity in the relationship between the residual claim of the agricultural sector for water (in a national water economy) and the residual claim of shareholders in a leveraged firm for dividends (in the world of finance). In both cases, allocations of water/dividends are made after the municipal sector/debt owners first receive their share of the water/interest payments.

4 - Merton models OR credit scoring: modelling default of a small business

Galina Andreeva, Management School & Economics, University of Edinburgh, 50 George Sq, EH8 9JY, Edinburgh , United Kingdom, Galina.Andreeva@ed.ac.uk, *Jake Ansell*, *Shu-Min Lin*

Modelling credit risk of a small business is under-researched area. The presentation compares two approaches by applying Merton-type and credit scoring models to predict financial health of the U.K. small businesses. The comparison is extended to cover several cut-off points, corresponding to different acceptance policies and risk appetites.

■ MD-13

Monday, 2:00 PM - 3:30 PM
Convention Centre: Committee Room 5

Finance: Stocks and bonds

Stream: Finance

Invited session

Chair: *Hitoshi Takehara*, Graduate School of Finance, Accounting and Law, Waseda University, 1-4-1 Nihombashi, 103-0027, Chuo-ku, Tokyo, Japan, takehara@waseda.jp

1 - An investigation in the autoregression of implied volatility in selected south African stocks

Olufemi Adetunji, Industrial and Systems Engineering, University of Pretoria, Faculty of Engineering, Built Environment and Information Technology, University of