Guide to the

20th Conference of the International Federation of Operational Research Societies

IFORS 2014

Barcelona, July 13-18 2014

www.ifors2014.com

Barcelona, July 13-18
IFORS 2014
The Art of Modeling

2 - Two approaches of scheduling problems in a distribution center with two cranes and interference constraint
Gabriela Naves Maschietto, Martin Gomez Ravetti, De Souza Mauricio

This work deals with the scheduling of jobs on two machines that may interfere each other. This problem often appears at logistic centers, such as warehouses and stockyards. Machinery as cranes and reclaimers, sharing the same rail may interfere in each other jobs. This work is based on a real case at a distribution center of steel coils, where two cranes on the same trail must load a sequence of trucks. We model the problem as a parallel scheduling problem and as a single multiprocessor. Mathematical programming models are proposed and tested for different organization policies of the coils.

3 - Energy efficient scheduling on a Single Machine
Michal Penn, Tal Raviv

Consider the problem of scheduling jobs on a single machine over T units of time. The time horizon [0,T] is divided into electricity tariff intervals of different lengths and tariffs. Each job delivered from the system yields a revenue and the energy cost of processing it is calculated proportionally to the lengths times the electricity tariffs the processing extends over. We consider two problems: Decide on the number of jobs to be produced and their schedule to maximize the total profit (revenue net energy cost).

4 - Scheduling of Identical Parts in Robotic Flow-shop for Different Cell Layouts
Florence Thiard, Nicolas Catusse, Nadia Brauner

Modeling modern manufacturing systems require to take into account transportation resources. Robotic cells consists in a flow-shop setup where transportation of the parts between machines is handled by a robot. We consider cyclic production of identical parts and optimization of the cell's throughput. Most results in the literature concern linear cells and one unit-production cycles; few studies consider other layouts. We study the extension of classical results to circular layout, where the cell's input and output buffers are at the same position.

■ TD-14

Tuesday, 14:00-15:30 - Room 124

DEA in Energy and Water services

Stream: DEA Applications
Contributed session
Chair: *M. Violeta Vargas-Parra*

1 - Evaluation of the Brazilian Electricity Distribution using Network DEA
Lidia Angulo-Meza, Placido Moreno, João Carlos Soares de Mello

Worldwide, DEA has been used to assess the electricity distributors' efficiency. Operational expenditures (OPEX) is the most used input, while energy distributed and number of consumers are the outputs. However, some papers use the network length as a second input, whereas research conducted in Brazil considers the network length as an output. We propose a new 2-stage model in which OPEX is the only input, energy distributed and number of consumers as outputs, and network length is the intermediate variable. Since OPEX is an input to both stages, we use a shared-input Network DEA model.

2 - Monitoring Efficiency and Productivity of Promoters in Wind Energy Sector
Clara Vaz, Ângela Ferreira

A DEA framework is proposed to explore the differences in performance of a set of wind farms, which involves two main promoters in the Portuguese wind energy sector. The study investigates the efficiency of the promoters in maximizing the energy produced from the physical resources and the wind velocity available in each farm. The overall performance of the two promoters is analyzed by comparing their differences in terms of the efficiency spread and productivity between their best-practice frontiers. Results may be used to support decision makers in the establishment of regulation policies.

3 - Measuring the Impact of Energy on Industry through: A DEA Approch
Nadia Kpondjo, Frederic Lantz, Anna Creti

In this paper, we solve the question of productive performance of DMU (Decision Making Unit) of the primary aluminium industry and analyze the impact of external factors such as energy supply on the change of these performances. Our methodology is based on a DEA approach. The key points that make up our contributions are: First: applying recent developments in DEA; Second: analyzing the change in performance of DMU over time; Third: analyzing the impact of external factors on conditional efficiency. We expect a disparity in the efficiencies of DMU with their technology and location.

4 - Water Treatment Plants Efficiency in México
M. Violeta Vargas-Parra, Francisco Vargas, Noemi Haro, Luis Rentería Guerrero

As energy prices increase, environmental concerns highlight the need to improve processes. The aim of this study is to measure the performance of water treatment plants during 2004-2010. The analysis encompasses all plants in the 32 states of Mexico. An input-oriented DEA model for determining an efficient frontier and derive relative positions of water treatment plants over the states, is applied. A ranking in best practices is obtained from this research, evidencing improvement opportunities oriented to cost reduction and environmental improvement throughout resource consumption reduction.

■ TD-15

Tuesday, 14:00-15:30 - Room 125

Strategic Consumer Behavior, Pricing and Customer Choice

Stream: Revenue Management II
Invited session
Chair: *Sumit Kunnumkal*

1 - Quantity Competition in the Presence of Strategic Consumers
Yuri Levin, Mikhail Nediak, Andrei Bazhanov

Oligopolistic retailers sell an undifferentiated limited-lifetime product to strategic consumers. A manufacturer sets the first-period (full) price, while the second-period (clearance) price is determined by Cournot equilibrium. Symmetric pure-strategy equilibria may result in no sales in the periods 1 or 2 (Cournot outcome versus collusion), and sales in both periods with the clearance price above or at the salvage value. Higher strategic behavior can be a benefit for retailers but hurt consumers, higher competition may harm local economy, and strategic behavior may insure against oversupply.

2 - Dynamic Pricing with Reference Price Effects under Heterogeneous Customer Arrivals
Zizhuo Wang

We consider a monopoly selling a single product over a certain horizon. Customers belong to different groups with different arrival patterns. For each customer, his demand depends on the price in this period, as well as the prices he observed in the past. Contrary to the prior literature on pricing with reference effect, we show that under the above assumptions, the optimal price path does not necessarily converge. Instead, it asymptotically converges to a cyclic pricing strategy with provable cycle lengths. Other properties of the optimal prices as well as numerical tests are studied.

3 - New Compact Linear Programming Formulations for Choice Network Revenue Management
Sumit Kunnumkal, Kalyan Talluri

We consider the network RM problem with customer choice and show that the affine relaxation is NP-complete even for a single-segment MNL model. Nevertheless, by analyzing the affine relaxation we derive new compact linear programs that approximates the dynamic programming value function better than choice deterministic LP, provably between the choice deterministic LP value and the affine relaxation, and often coming close to the latter in our numerical experiments.