The planning of piglet production is central into modern pig production in connection with supply chain coordination. The complexity of piglet production is mainly affected by the stochastic nature of biological processes involved, highly variability on markets and rational scheduling of tasks on farm. In this way, the farmer has to make decisions today at different levels of uncertainty that are affecting future performances of the farm and chain. Hence a preliminary multistage stochastic programming model with recourse for planning piglet production under finite time horizon is presented.

3 - Optimization of reproduction and production cycles for high yielding dairy cows

Joanna M. Makulska, Department of Cattle Breeding, University of Agriculture in Krakow, al. Mickiewicza 24/28, 30-059, Kraków, Poland, rzmakuls@cyf-kr.edu.pl, *Andrzej Węglarz, Anna Stygar, Barbara Tombarkiewicz*

The aim of the study was to use a multi-level hierarchical Markov decision process for the optimal management of reproduction and production cycles of dairy cows. The parameters of the developed model were estimated using the data records from the specific herd of high yielding cows in Poland. The optimized decisions concerned the length of days open and days dry periods in the consecutive calving intervals of a cow and the time of her replacement with a heifer. The criterion of optimality was assumed as the maximization of the total present value of the expected net returns per cow place.

4 - Replacement policies for dairy cows

Lars Relund Nielsen, Centre for Operations Research Applications in Logistics (CORAL), Aarhus School of Business, University of Aarhus, Fuglesangs Allé 4, 8210, Aarhus V, Denmark, lars@relund.dk, *Anders Ringgaard Kristensen, Erik Jørgensen*

In a recent paper a hierarchical Markov decision processes (MDP) with finite state and action space was formulated for the dairy cow replacement problem with stage lengths of 1 d. Bayesian updating was used to predict the performance of each cow in the herd and economic decisions were based on the prediction. The model can be used to assist the farmer in replacement decisions on a daily basis and is based on daily milk yield measurements that are available in modern milking systems. This talk will present the results of the paper and discuss directions for further research.

■ MF-33

Monday, 17:20-18:40
8.2.19

Environmental Management II

Stream: Energy, Environment and Climate [c]
Contributed session
Chair: *Christos Ioakimidis*, MECHANICAL ENGINEERING, INSTITUTO SUPERIOR TECNICO (IST) - UNIVERSIDAD DE LISBOA (UTL), Av. Rovisco Pais, 1049-001, LISBON, Portugal, christos.ioakimidis@dem.ist.utl.pt

1 - The effect of environmental uncertainty on operations priorities and business performance

Ahmed Attia, business management, alexandria university, elgomohoria st., 000, damanhour, elbehera, Egypt, ahmed-attia2005@hotmail.com

Operations strategy is a one of the Functional strategies which help the company to deal with the environmental uncertainty, the operations strategy could be translated into operations priorities (cost,Flexibility,quality,delivery). The current research investigated the effect of environmental uncertainty on operations priorities,then the research investigated the effect of operations priorities on buisness performance. The current research data was collected from egyptian Pharmaceutical industry

2 - Integrating Environmental Considerations into the Supplier Selection Criteria

Ceyda Şen, Yildiz Technical University, Turkey, cgungor@yildiz.edu.tr, *Mercan Ozturk, Özge Nalan Alp*

In the traditional supplier selection process, standart criteria like cost, quality and delivery performance are considered. However, growing environmental concerns have led the purchasing professionals to develop green purchasing strategies, and to rethink the supplier selection process which has neglected environmental impacts. To facilitate the process of the green supplier selection, this paper presents an extensive literature review on environmental considerations, and a hierarchical criteria structure that integrates these factors into the traditional supplier selection criteria.

3 - Airline Service Network Design for Economic and Ecologic Sustainability

Amir José Daou Pulido, Karlsruhe Institute of Technology, Klosterweg 28, Zimmer b16, 76131, Karlsruhe, Baden-Württemberg, Germany, amir.pulido@student.kit.edu, *Cornelia Schoen*

In an effort to help reduce CO_2 emissions and mitigate the climate impacts, the EU recently announced that as from 2012 the aviation sector will be included in the EU Emissions Trading Scheme. In particular, all flights starting and landing in the EU will be subject to a cap on their emissions. In preparation of this regulation, airlines are spurred to explore how they can improve their operations for economic and ecologic sustainability. We present an optimization model for airline service network design that integrates profit and environmental goals to comply with the new regulation

4 - Enhancing electric energy management decisions with an Energy box

Luis Oliveira, Mechanical Eng., Instituto Superior Técnico, Rua Sarmento Beires nº 15 5°direito, 1900-410, Lisboa, Lisboa, Portugal, luis.jose.oliveira@gmail.com, *Christos Ioakimidis, Paulo Ferrao*

This study presents a future where the consumer has an Energy box, a 24/7 processor operating on a PC, to manage the electrical energy at his residence or small business, integrated in a microgrid. The considered model is a house with microrenewables production, air conditioner, and an electric vehicle that provides storage capacity. We propose an algorithm for the energy box with forecasted parameters (weather, electricity prices) and deterministic parameters (house's loads, temperatures) as input, to obtain increases in the renewable energies penetration, power quality, and cost reduction

■ MF-34

Monday, 17:20-18:40
8.2.23

Model Formulations and Real World Applications of Lot Sizing and Scheduling II

Stream: Lot-sizing and Scheduling, Economic Order Quantity
Invited session
Chair: *Reinaldo Morabito*, Dept. of Production Engineering, Federal University of São Carlos, CP 676, 13565-905, São Carlos, Sao Paulo, Brazil, morabito@ufscar.br

1 - A production scheduling problem on an aerospace assembly fixture

Horacio Yanasse, LAC, INPE, Av. dos Astronautas 1758, CP 515 - INPE/CTE, 12227-010, São José dos Campos, SP, Brazil, horacio@lac.inpe.br, *Bruno Silva, Reinaldo Morabito*

In this work we consider a production scheduling problem in an aerospace industry where workstations are located side by side in an assembly fixture. Depending on the jobs, adjacent workstations cannot process them at the same time due to space limitations. Moreover, jobs have precedence constraints, due dates, arrival times and technological constraints. The objective is to minimize the makespan. The problem is formulated as an MIP and solved by CPLEX. The solution obtained can improve significantly the production schedule when compared with the one used in practice.

2 - A hybrid general lot-sizing and scheduling formulation for a production process with a two-stage product structure

Sandra Transchel, Department of Supply Chain and Information Systems, Penn State University, 461 Business Building, 16802, University Park, PA, United States, sxt37@psu.edu