من با هزینه دانشگاه در کنفرانس زیر شرکت کرده و مقاله را ارائه نموده ام

a simulation framework to provide forecasts of short-term bed needs. The web-based tool has been piloted in UK hospitals and is supported by the Met Office.

■ TB-38

Tuesday, 10:30-12h00
HH-Colombus

Hybrid Evolutionary Multiobjective Optimization Algorithms

Stream: Multiobjective Optimization
Invited session

Chair: *Karthik Sindhya*, of Mathematical Information Technology, University of Jyväskylä, Finland, karthik.sindhya@jyu.fi

1 - A Preference-based Evolutionary Algorithm for Multi-objective Optimization: The Weighting Achievement Scalarizing Function Genetic Algorithm

Ana Belen Ruiz, Applied Economics (Mathematics), University of Malaga, C/ Ejido, 6, 29071, Malaga, Spain, abruiz@uma.es, *Rubén Saborido Infantes*, *Mariano Luque*

We suggest a preference-based EMO algorithm which asks the DM for a reference point (RP) and which is based on the EMO algorithm NSGA-II and on achievement scalarizing functions (ASFs). In practice, an ASF finds the closest efficient solution to the RP, and this solution also depends on a weight vector used in the ASF. The proposed approach modifies the dominance criterion of NSGA-II in order to highlight solutions closer to the RP. The classification of the points into the nondominated fronts is done according to the values that each solution takes on an ASF, using different weight vectors.

2 - Preference-based Evolutionary Algorithm for Multi-objective Bilevel Optimization

Pekka Malo, Information and Service Economy, Aalto University School of Economics, Runeberginkatu 22-24, 00100, Helsinki, Finland, pekka.malo@aalto.fi

We present an evolutionary framework for solving multiobjective bilevel problems, where the upper-level has multiple objectives and lower-level has a single objective. The implementation of the algorithm is based on a new technique for approximating the optimal lower-level solution mapping by a class of smooth and continuous single-valued functions. The algorithm is well-motivated by the recent results obtained for general parametric optimization problems and set-valued analysis. The performance of the algorithm is demonstrated with respect to a collection of scalable test-problems.

3 - A Hybrid Evolutionary Multi-objective Optimization Algorithm for Enhanced Convergence and Diversity

Karthik Sindhya, of Mathematical Information Technology, University of Jyväskylä, Finland, karthik.sindhya@jyu.fi, *Kaisa Miettinen*, *Kalyanmoy Deb*

Evolutionary multi-objective optimization (EMO) algorithms are used to find approximate Pareto optimal solutions, though they have slow convergence speed. We present a modular hybrid EMO algorithm including a local search module (involving an achievement scalarizing function) to increase the convergence speed, a diversity enhancement module, etc. It can be connected with various EMO methods like MOEA/D. Numerical tests on test problems indicate the efficacy of our hybrid EMO algorithm, which can also be used to handle dynamic process simulation based multi-objective optimization problems.

■ TB-39

Tuesday, 10:30-12h00
HH-Cousteau

MCDA: New Approaches and Applications 1

Stream: MCDA: New Approaches and Applications
Invited session

Chair: *Gerhard-Wilhelm Weber*, Institute of Applied Mathematics, Middle East Technical University, ODTÜ, 06531, Ankara, Turkey, gweber@metu.edu.tr
Chair: *Yves De Smet*, SMG - CODE, Université Libre de Bruxelles, Boulevard du Triomphe CP 210-01, 1050, Bruxelles, Belgium, yves.de.smet@ulb.ac.be

1 - Monotonicity and minimax biproportional apportionments

Paolo Serafini, Dept. of Mathematics and Computer Science, University of Udine, Via delle Scienze 206, 33100, Udine, Italy, paolo.serafini@uniud.it

We deal with biproportional apportionment problems (BAP). On one hand we may approach BAP via the axiomatic approach where some axioms are stated and the assigned seats must satisfy the axioms. Another approach requires the definition of quotas and the seats must minimize an error measure wrt the quotas. It is therefore important to understand to what extent error minimization methods satisfy the most common axioms. In this talk we investigate the axiom of monotonicity and show that minimization of the maximum absolute error with respect to regional quotas satisfies monotonicity.

2 - Multi attribute regional market location problem based on the clustering approach

Mohsen Yahyayi, Shahed University, Iran, Islamic Republic Of, mohsen.yahyayi@gmail.com, *Mahdi Bashiri*

Regional market location is considered in this paper; a hybrid approach is presented including 3 phases of clustering, elimination and decision making. In the first phase cities are clustered with maximum homogeneity. Then low potential points are eliminated. Finally cities are ranked to be a regional market according to (1) Distance from the cluster median point optimized by SFLP to have less transportation cost, (2) City population, (3) Distance from major transportation corridors, (4) Tourism attractions. Our approach was applied in Iran regional market using 10-means clustering.

3 - A Careful Look at Criterion Importance and Weights

Pekka Korhonen, Aalto University School of Economics, 00100, Helsinki, Finland, pekka.korhonen@aalto.fi, *Jyrki Wallenius*, *Anssi Oorni*

We investigate the connection between announced importance of criteria and weights. Our considerations are based on a simple experimental setting, where the subjects were asked to pairwise compare alternatives with two criteria. We used the subjects' responses to choices to estimate the weights and compared them to "direct' (given) weights. The comparison was based on prediction power of a linear function. Our results point out that there is a reason to question the common belief that the values of the weights have the same rank order as criteria importance.

4 - Rank reversal in the PROMETHEE I and II rankings: a summary of recent investigations

Yves De Smet, SMG - CODE, Université Libre de Bruxelles, Boulevard du Triomphe CP 210-01, 1050, Bruxelles, Belgium, yves.de.smet@ulb.ac.be, *Céline Verly*, *Julien Roland*

The multicriteria methods based on pairwise comparisons suffer from possible rank reversal occurrences when the set of alternatives is modified. We study this distinctive feature in the scope of the PROMETHEE I and II methods. First, empirical tests are conducted on the basis of artificial data sets in order to quantify the likelihood of rank reversal instances. Then conditions to avoid this phenomenon are provided. Finally, we investigate manipulation risks on a simplified version of PROMETHEE II.