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Optimization and its Applications
in Learning and Industry
(OptALI)

IRSES

Ongoing Deliverable D1.2

Description of Research Seminar:
Optimization over the Efficient Set of
a Multiobjective Problem

Start date of the Workpackage: January 2012

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Participants: UNIKL
UOA

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Research Seminar

offered by Ethan Zhengliang Liu (University of Auckland)

in February 2013,

in University of Kaiserslautern

Subject: Optimization over the Efficient Set of a Multiobjective Problem

Problem: Many real world decision making problems can be formulated as optimization problems that involve the simultaneous optimization of several conflicting objectives, e.g. minimising cost versus minimising adverse environmental impacts in infrastructure projects. Instead of optimal solutions, multiobjective optimization problems have a whole set of so called efficient solutions. A solution is efficient if it does not allow the improvement of an objective without deterioration of at least one other objective. Therefore efficient solution represent the available trade-offs between the conflicting objectives. Hence efficient solutions are the reasonable choices for a rational decision maker. However, in practice only one solution will be eventually implemented. This means the decision maker faces the problem of selecting one of the efficient solutions for implementation. Assuming the decision maker has a utility function, this problem can be mathematically interpreted as that of maximizing the utility function over the efficient solutions of the underlying multiobjective optimization problem.

Main Results: In this research we developed new approaches to solve the problem. We built on recent advances in algorithms for solving multiobjective linear programmes, i.e. multiobjective optimization problems with linear objectives and linear constraints. We proposed both primal and dual algorithms to solve the problem in objective space. Computational experiments were conducted to compare the new algorithms with other existing objective-based algorithms.

Participants: UNIKL researchers

Publication: -