

#### Centro de Investigação em Matemática e Aplicações Departamento de Matemática

# **Seminário**

#### 23 de Novembro de 2010, Terça-feira CLAV – Anf. 1 - 14:00 horas

### Pareto Frontier Visualization in Decision Making under Uncertainty and Risk

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## **Resumo**

A generic approach to decision support under uncertainty and risk is described. The approach is based on transforming the decision problems under study into multi-objective decision problems, which objectives describe different aspects of uncertainty and risk, and on subsequent study of the multi-objective problem by means of visualization of the Pareto frontier displayed in the form of decision maps, i.e. collections of the tradeoff curves. The decision maps are studied by the decision maker interactively and animated. In this process, the decision maker learns the objective tradeoffs for three to seven objectives. This information helps him/her to identify the preferred combination of the objective values (the goal), which is specified directly at one of the tradeoff curves. The computer constructs the decisions associated with the goal. Several examples of implementation of the approach in different decision problems with uncertainty and risk are described: in selecting from the finite sets of stochastic alternatives and in selecting from the finite sets of alternatives given by attribute intervals, in robust analysis, i.e. analysis of the decision making problems in the case of radical uncertainty about the future, as well as in supporting the planning procedures in the case of fuzzy feasible decision sets.