

DeCoMo Workshop

April 8, 2015, University of Jyväskylä, Agora building (Mattianniemi 2)

Place: Ag C 221

- 9.30-10 Coffee and welcome
- 10-10.40 Francisco Ruiz: **Hybrid Interactive Multiobjective Optimization Systems. Some Real Applications**
- 10.40-10.50 Discussion
- 10.50-11.30 Thomas Bäck: **Optimization in Industry: Challenges and Multiobjective Examples**
- 11.30-11.40 Discussion
- 11.40-12.15 Introduction of DeCoMo project, Part 1 (Jin and Miettinen)

Place: Ag D 125.1

- 12.15-13 Lunch
- 13-13.15 Introduction of DeCoMo project, Part 2 (Jin and Miettinen)
- 13.15-15.40 Introduction of companies and case descriptions
- 15.40 Coffee
- 15.40-16 Wrap up
- 16-17 2nd steering group meeting of the DeCoMo project

Registration deadline: March 30, 2015. Send email to tinkle.t.chugh@jyu.fi. Remember to inform him of possible dietary restrictions.

Companies - please note the following:

- several participants/company are most welcome
- introduction of company (about 10 minutes)
 1. main products and services
 2. background/responsibility of the speaker
 3. what kind of problems do you typically solve?
 4. in your context, what kind of problems can optimization solve (have you already got experience with utilizing optimization)
 5. challenges you want to tackle
- description of case(s) for the project (about 20 minutes)

Hybrid Interactive Multiobjective Optimization Systems. Some Real Applications

Francisco Ruiz, University of Málaga, Spain

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Abstract. Interactive methods have proved to be extremely useful multiobjective techniques, when it comes to solve real complex decision making problems. Their iterative schemes are especially suitable for the necessary learning process that has to be present in every decision making process. Many different interactive methods exist, and they vary both in the type of information that the decision maker (DM) has to provide at each iteration, and in the way the different solutions are obtained along the process. The information required from the DM can take many different forms (just choosing one solution among a set of possible solutions, giving local tradeoffs, giving reference or target values, classifying the objectives...). But in many cases, the interactive method is chosen without taking into account the cognitive burden that it implies for the DM. In this sense, we have developed hybrid interactive multiobjective systems, where the DM can decide at each step the type of information (s)he prefers to give, and the system internally switches to the most appropriated method. The idea is to adapt the resolution process to the necessities of the DM, and not vice versa. We have applied these interactive systems to several real problems, including the budget assignment to the hospitals of our Regional Sanitary System, the determination of the optimal electricity mix of Andalucía, or the calculation of the optimal dimensions of a solar thermal plant.

Optimization in Industry: Challenges and Multiobjective Examples

Thomas Bäck, Natural Computing Group, Leiden Institute of Advanced Computer Science (LIACS), Leiden University, Netherlands

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Abstract: Industrial optimization problems often characterized by a number of challenging properties, such as time-consuming function evaluations, high dimensionality, a large number of constraints, and multiple optimization objectives.

Working with Evolutionary Strategies, we have optimized them over the past decades for such optimization problems. Certain variants are particularly effective, and set-oriented selection criteria such as SMS-EMOA are useful for approximating the Pareto front in case of multiobjective optimization.

In this presentation, we will illustrate these aspects by referring to industrial optimization problems, such as they occur in the automotive and many other industries. We will show that evolutionary strategies can be very effective even in case of very small numbers of functions evaluations, and that they can approximate Pareto fronts very well.