

*Málaga, June 2013*

Executive Summary

TITLE: **D4.4.3: Analysis and evaluation of different multiobjective metaheuristics on benchmarks of robust optimization problems (GTCO)**

PAPERS RELATED:

- Francisco Luna, J. Francisco Chicano, Enrique Alba: **Robust solutions for the software project scheduling problem: a preliminary analysis**. *International Journal of Metaheuristics*, 2(1): 56-79 (2012).
- J. Francisco Chicano, Alejandro Cervantes, Francisco Luna, Gustavo Recio: A Novel Multiobjective Formulation of the Robust Software Project Scheduling Problem. *EvoApplications 2012*: 497-507.
- F. Luna, D. González-Álvarez, F. Chicano, M. A. Vega-Rodríguez, The Software Project Scheduling Problem: a scalability analysis of multi-objective metaheuristics, *Applied Soft Computing* 15: 136-148

ABSTRACT:

The main goal for any optimization problem is to find its optimal solutions. However, in practice, users may not always be interested in finding these global best solutions, specially when these solutions are quite sensitive to perturbations that cannot be avoided when implemented in the real-world [DG06]. In such scenarios, one is interested in finding robust solutions, which are less sensitive to variable perturbations in their neighborhood. Several benchmark problems have been proposed to deal with such problems, introducing different levels of noise, stochasticity, and uncertainty. The GTCO benchmark is a framework for the construction of robust continuous MO test functions characterized by different noise-induced features, so that multi-objective metaheuristics can be faced to different levels of difficulty [GTC+10]. We have evaluated six state-of-the-art MOEAs, namely: NSGA-II, SPEA2, PAES, MOCcell, GDE3, and MOEA/D to evaluate their effectiveness within this benchmark.

GOALS:

1. Analysis of efficiency, efficacy, scalability and robustness in academic benchmarks.
2. Analysis of efficiency, efficacy, scalability and robustness in problem generators.

CONCLUSIONS:

Attending to different quality indicators the following conclusions can be drawn:

1. GDE3 performs the best with respect to I_{HV} and I_{ϵ}
2. NSGA-II and MOCcell reached the second best values for these indicators

RELATION WITH PAST
DELIVERABLES:

PRE: None.

OTHERS:

[DG06] K. Deb and H. Gupta. 2006. Introducing robustness in multi-objective optimization. *Evol. Comput.* 14, 4 (December 2006), 463-494

[GTC+10] C. K. Goh, K. C. Tan, C. Y. Cheong, and Y. S. Ong. 2010. An investigation on noise-induced features in robust evolutionary multi-objective optimization. *Expert Syst. Appl.* 37, 8, (August 2010), 5960-5980