



*Málaga, March 2013*

## Executive Summary

TITLE: **D3.6.2: Definition of promising mechanism of hybridization**

PAPERS RELATED:

- Luque, G., and Alba, E. (2014, July). **Enhancing parallel cooperative trajectory based metaheuristics with path relinking**. In Proceedings of the 2014 conference on Genetic and evolutionary computation (pp. 1039-1046). ACM.

ABSTRACT:

This deliverable proposes a novel algorithm combining path relinking with a set of cooperating trajectory based parallel algorithms to yield a new metaheuristic of enhanced search features. Algorithms based on the exploration of the neighbourhood of a single solution, like simulated annealing (SA), have offered accurate results for a large number of real-world problems in the past. Because of their trajectory based nature, some advanced models such as the cooperative one are competitive in academic problems, but still show many limitations in addressing large scale instances. In addition, the field of parallel models for trajectory methods has not deeply been studied yet (at least in comparison with parallel population based models). In this work, we propose a new hybrid algorithm which improves cooperative single solution techniques by using path relinking, allowing both to reduce the global execution time and to improve the efficacy of the method. We test here this new model using a large benchmark of instances of two well-known NP-hard problems: MAXSAT and QAP, with competitive results.

GOALS:

1. Build a new hybrid by combining path relinking (PR) with a cooperative trajectory methods.
2. Create efficient implementations of PR technique.
3. Study the influence of the selected solution from the set of solutions generated by PR.

CONCLUSIONS:

1. We have developed a new parallel model for trajectory based methods, which improves the cooperation phase by means of adding path relinking technique.
2. The results show that our proposed method is more accurate and efficient than the existing one.
3. We have studied different design alternatives such as the several cooperation schema or different mechanism to select the next solution from the set of solutions generated by path relinking.

RELATION WITH PAST

DELIVERABLES:

PRE: D3.6.1 (advisable reading)

POST: D4.4.1 (advisable reading)