Málaga, June 2012

Executive Summary

TITLE:

D4.4.1: Analysis and evaluation of different metaheuristics on benchmarks of combinatorial optimization problems (MAXSAT, QAP, Knapsack)

PAPERS RELATED:

- Chicano, F., Luque, G., and Alba, E. (2013, July). **Problem understanding through landscape theory**. In Proceeding of the fifteenth annual conference companion on Genetic and evolutionary computation conference companion (pp. 1055-1062). ACM.

ABSTRACT:

In order to understand the structure of a problem we need to measure some features of the problem. Some examples of measures suggested in the past are autocorrelation and fitness-distance correlation. Landscape theory, developed in the last years in the field of combinatorial optimization, provides mathematical expressions to efficiently compute statistics on optimization problems. In this deliverable we discuss how can we use landscape theory in the context of problem understanding and present two software tools that can be used to efficiently compute the mentioned measures. This can be applied to traditional combinatorial optimization problems such as Quadratic Assignment Problem (QAP), Traveling Salesman Problem (TSP), Unconstrained Quadratic Optimization (UQO), Subset Sum (SS), Frequency Assignment Problem (FAP), DNA Fragment Assembly (DFA) or linear combinations of Walsh Functions.

GOALS:

1. Study the utilization of some theoretical developments to understand classical problems.
2. Present software tools to efficiently compute the mentioned measures.

CONCLUSIONS:

1. We have shown how landscape theory can be used to find new statistics of the problems.
2. We have shown how efficiently compute statistics and measures of optimization problems.
3. We also described some software tools implementing algorithms that can compute the measures and statistics.

RELATION WITH PAST DELIVERABLES:

PRE: D2.3.1 and D2.4.1(advisable reading)

PRE: D2.4.2 (advisable reading)