



Málaga, December 2014

Executive Summary

TITLE: **D4.6.2: Analysis and evaluation of different metaheuristics using the FAP problem generator.**

PAPERS RELATED:

- Andrew M. Sutton, Francisco Chicano, L. Darrell Whitley (2013). Fitness Function Distributions over Generalized Search Neighborhoods in the q -ary Hypercube. *Evolutionary Computation* 21: 561–590.

ABSTRACT:

The document analyzes the Frequency Assignment Problem from the point of view of Discrete Fourier Analysis. This analysis can be used to exactly compute some statistics about the fitness landscape of the problem. In the past, these statistics have shown a correlation with performance measures of some metaheuristic algorithms. Fourier Analysis has also been used in the past to exactly compute the performance of an Evolutionary Algorithm without running the algorithm. Using generalized Walsh functions as Fourier basis, we provide an expression for the Fourier coefficients of a Frequency Assignment Problem from the instance data.

GOALS:

1. Fourier Analysis of the Frequency Assignment Problem.

CONCLUSIONS:

1. We provided expressions for the Fourier coefficients of the Frequency Assignment Problem.
2. The basis for this Fourier Analysis is the set of generalized Walsh functions, which are eigenvalues of the one-change neighborhood.
3. Using the Walsh coefficients we can also compute the expected fitness value after a mutation consists in a random change of one element in the solution vector.

RELATION WITH PAST DELIVERABLES: D2.2.1, D2.3.2, D2.4.1, D4.6.1

OTHERS: