

*Málaga, Mes de 2013*

Executive Summary

TITLE: **D2.3.1: Autocorrelation measures for combinatorial optimization problems.**

PAPERS RELATED:

- F. Chicano, G. Luque, E. Alba, Autocorrelation Measures for the Quadratic Assignment Problem, *Applied Mathematics Letters*, 25(4):698-705
- F. Chicano, and E. Alba, Elementary Landscape Decomposition of the 0-1 Unconstrained Quadratic Optimization, *Journal of Heuristics* 19(4):711-728

ABSTRACT:

We provide an exact expression for computing the autocorrelation coefficient ξ and the autocorrelation length ℓ of any arbitrary instance of the Quadratic Assignment Problem (QAP) in polynomial time using its elementary landscape decomposition. We also provide empirical evidence of the autocorrelation length conjecture in QAP and compute the parameters ξ and ℓ for the 137 instances of the QAPLIB. Our goal is to better characterize the difficulty of this important class of problems to ease the future definition of new optimization methods. Also, the advance that this represents helps to consolidate QAP as an interesting and now better understood problem.

GOALS:

1. Exact expression for the autocorrelation function, coefficient and length of QAP.

CONCLUSIONS:

1. We give an optimal way of exactly computing the autocorrelation measures ξ and ℓ for the QAP. These two parameters are important to better characterize QAP and to guide practitioners in the relative difficulty of the existing problem instances.
2. These results can be automatically applied to all the subproblems of QAP, like de TSP.

RELATION WITH PAST

DELIVERABLES:

PRE: D2.4.1 (advisable reading)

POST: D2.3.2 (advisable reading)

OTHERS:

E. Angel, V. Zissimopoulos, On the landscape ruggedness of the quadratic assignment problem, *Theoretical Computer Science* 263 (2000) 159–172