



Málaga, July 2012

Updated: April 2013

Executive Summary

TITLE: **D2.1.1: Unify mathematical takeover model for enhanced versions of evolutionary algorithms**

PAPERS RELATED:

- Bravo, Y., Luque, G., and Alba, E. (2013, April). **Takeover time in dynamic optimization problems**. In Computational Intelligence in Dynamic and Uncertain Environments (CIDUE), 2013 IEEE Symposium on (pp. 25-30). IEEE.

ABSTRACT:

The analysis of selection pressure is a mathematical tool that has been traditionally used for studying the dynamics of population-based optimization algorithms in stationary environments, but in dynamic optimization problems (DOPs) it is still an open issue. Common metrics such as growth curve and takeover time have no clear meaning when the problem changes over time. In this deliverable is proposed a new definition of takeover time for DOPs. For the sake of clarity, we focus on evolutionary algorithms (EA), but results could be extended to other population-based algorithms. A model for calculating takeover time values is proposed and then its accuracy is later experimentally validated.

GOALS:

1. Definition of the concept of takeover time for population-based optimization algorithms in DOPs.
2. Analyze different variants for takeover time in DOPs.
3. Test the different variants on a benchmark to experimentally validate the models.

CONCLUSIONS:

1. We introduce for the first time the concept of takeover time for population-based optimization algorithms in DOPs.
2. We propose an exact model for tournament selection and a “reactive” approaches for DOPs.
3. The experiments using this model provide us very accurate results.

RELATION WITH PAST

DELIVERABLES:

PRE: none

POST: D2.1.2 (advisable reading)