1. Plenary Title: Methodologies for solving complex multi-objective Combinatorial Problems in Engineering: an evolutionary approach

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Abstract. A general MOP includes a set of n parameters (decision variables), a set of k objective functions and a set of m restrictions. The objective and restriction functions are functions of the decision variables where is possible to obtain a set of optimal values. Then the MOP can be expressed as:

Optimize $y = f(x) = (f1(x), f2(x), \ldots , fk(x))$
Subject to $e(x) = (e1(x), e2(x), \ldots , em(x))$ 0
Where $x = (x1, x2, \ldots , xn)$ X
$y = (y1, y2, \ldots , yk)$ Y

The term evolutionary algorithm (EA) refers to searching and optimization techniques inspired by the evolution model proposed by Charles Darwin after his exploratory trips. Genetic algorithms are used in several areas especially for searching and optimizations. In the praxis the algorithm is implemented by choosing a coding for the possible solutions to the problem. The coding is done through chains of bits, numbers or characters that represent the chromosomes. The crossing and mutation operations are applied in a very simple way through functions of vector value manipulation. The EAs are interesting given the fact that at first glance they seem especially apt to deal with the difficulties presented by MOPs. The reason for this is that they can return an entire set of solutions after a simple run and they do not have any other of the limitations of traditional techniques. In addition, some researchers have suggested that the EAs would behave better than other blind searching techniques.

In this Keynote, I´m going to explain the multiobjective optimization problems and how the EA can give a really good solutions in this kind of problems.

2. Brief Biography

Prof. Dr. Yezid DONOSO was born in Barranquilla (Atlántico), Colombia, in 1971. He received the M.Sc. degree in System and Computing Engineering (Computer Nets) in 1998 and Ph.D. degree CUM LAUDE and PostPh.D in Computer Technologies from the University of Girona, Girona, Spain, in 2005 and 2007, respectively. He is Associated Professor and Academic sub chair of Department of System and Computing Engineering of Universidad de los Andes, Bogotá, Colombia. Chair of Master and Speciality in Information Security. Consultant with more of 17 experiences years in TI at National and International Projects in topics of Analysing and Designs of Communication Nets, Information Security, TI Infrastructure, Business Continuity, among others.

He has the category of Senior Researcher in Colciencias (Administrative Department of Science, Technology and Innovation), Colombia, is Senior Member, IEEE, and is Expert Evaluator (ID EX2014D193577) by European Commission. He was IEEE President at Colombia (2013–2014) and Member of CLEI (Centro Latinoamericano de

Estudios en Informática) Board between 2008–2012. Since 2012 is Honorary Member of the Agora University Senate, Oradea, Romania, and since 2007 is Member of Universidad del Norte Board, Barranquilla, Colombia.

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