## GUEST EDITORIAL PREFACE

# Special Issue from the 4th Portuguese-Brazilian Summer School on Evolutionary Computation

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The 4th Portuguese-Brazilian Summer School on Evolutionary Computation (ELBCE-Coimbra) took place from July 11 to July 14, 2013, in Coimbra, Portugal.

This was the fourth edition of a series of events that aim to promote evolutionary computation and related topics among graduate students and, also, to foster the cooperation between Portuguese and Brazilian researchers working in this area.

ELBCE-Coimbra comprised introductory and advanced tutorial lectures, hands-on practical classes, thematic sessions describing the application of evolutionary techniques to real-world optimization problems, and a poster session where students were able to present and discuss their research. ELBCE-Coimbra received approximately 70 registrations, including graduate students, researchers, and practitioners, from optimization, natural computing and operations research areas. This diversity improved the quality of the sessions and helped to create a lively and informal atmosphere.

The authors of the best posters presented at ELBCE-Coimbra were invited to submit an extended version of their research to a special issue of IJNCR. The goal of this volume is to present a selection of the best contributions received from the students that attended the summer school.

The paper "*Optimization of a Three Degrees of Freedom DELTA Manipulator for Well-Conditioned Workspace with A Floating Point Genetic Algorithm*" describes the application of a genetic algorithm to an optimization problem from the field of robotics, namely the design of a DELTA manipulator. The algorithm was able to identify and adjust the most important

parameters that control the behaviour of the manipulator, thus outperforming previous configuration approaches.

The paper "*Object-Oriented Evolutionary Testing: A Review of Evolutionary Approaches to the Generation of Test Data for Object-Oriented Software*" provides a critical analysis of object-oriented evolutionary testing. In this area of research, evolutionary algorithms are applied to search for software testing data. The contribution focuses on a recent line of research that considers object-oriented systems to enhance the effectiveness of evolutionary testing systems.

The third contribution entitled "*A Genetic Algorithms Approach for Inverse Shortest Path Length Problems*" describes the application of a bio-inspired algorithm to an important combinatorial optimization problem, the inverse shortest path length. The current paper addresses the problem by considering the realistic possibility that some information is missing and/or is inaccurate. This leads to a highly complex and widely relevant definition of the problem and the authors propose an evolutionary approach that efficiently finds good quality solutions.

Finally, the paper "*Developments on the Regulatory Network Computational Device*" deals with artificial regulatory network models. This contribution departs from ReNCoDe, a well-established model, and proposes two important extensions: it empowers the model with feedback connections and adds the possibility to deal with situations having multiple outputs.

The selected contributions reveal the diversity of themes addressed by Portuguese and Brazilian graduate students working on evolutionary computation and highlight the quality of research done in these two countries. We believe that future ELBCE events will contribute to further enhance the vitality of research performed in this area both in Portugal and in Brazil.

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