

EVOLUTIONARY ALGORITHMS AND METAHEURISTICS IN CIVIL ENGINEERING AND CONSTRUCTION MANAGEMENT

J. MAGALHAES-MENDES^{*}, D. GREINER[†]

^{*} Departamento de Engenharia Civil
CIDEM
ISEP – Instituto superior de Engenharia – Instituto Politécnico do Porto
Rua Dr. António Bernardino de Almeida, 431 – 4200-072 Porto
PORTUGAL
Email: jjm@isep.ipp.pt

[†] Institute of Intelligent Systems and Numerical Applications in Engineering (SIANI)
Universidad de Las Palmas de Gran Canaria, 35017, Las Palmas, Spain
E-mail: dgreiner@iusiani.ulpgc.es

Key words: Evolutionary Algorithms, Genetic Algorithms, Metaheuristics, Computational Methods, Civil Engineering, Construction Management, Optimum Design, Robust Design.

ABSTRACT

The main objective of this symposium is to bring together researchers and to generate interest in presenting papers on new approaches, in the field of evolutionary algorithms and metaheuristics in civil engineering and construction management.

The communications must address evolutionary algorithms and metaheuristics applied in solving optimum design problems in civil engineering [1], construction management [2] and related topics.

The evolutionary algorithms are an interdisciplinary research area comprising several paradigms inspired by the Darwinian principle of evolution. The current stage of research considers, among others, the following paradigms: Genetic Algorithms, Genetic Programming, Evolutionary Programming, Evolution Strategies and Differential Evolution, in addition to other metaheuristic paradigms such as Particle Swarm Optimization or Ant Colony Optimization.

Applications of these optimization methods in civil engineering and construction management are welcomed, both for mono-objective and multiobjective optimization problems [3].

Topics to be covered (but are not limited to) are:

- In the area of civil engineering content related to structural design (e.g.: concrete and metal structures)[4], geotechnics, hydraulics, and infrastructure are welcome.
- In the area of construction management related content can be project management, planning, coordination and control of projects, cost and time management, among others.

- Development aspects such as including surrogate modelling, parallelization, performance comparisons among methods, are encouraged.

REFERENCES

- [1] D. Greiner, JM. Emperador, B. Galván, G. Winter, "Structural Engineering Optimum Design using Evolutionary Multiobjective Algorithms: Tools and Lessons learned", EUROGEN 2011, 9th International Conference on Evolutionary and Deterministic Methods for Design, Optimization and Control with Applications to Industrial and Societal Problems, CIRA, Italy, 2011.
- [2] J. Magalhães-Mendes, Hybrid Genetic Algorithms: Modeling and Application to the Scheduling Problems in *Handbook of Genetic Algorithms: New Research*, Editors: Adalberto Ramirez Muñoz and Ignacio Garza Rodriguez, Nova Science Publishers, NY, USA, 2012.
- [3] C. Coello Coello, "Evolutionary Multi-Objective Optimization: A Historical View of the Field", IEEE Computational Intelligence Magazine, 1, 28-36 (2006).
- [4] R. Kicinger, T. Arciszewski, KA. De Jong, "Evolutionary Computation and structural design: A survey of the state of the art", Computers & Structures, 83, 1943-1978 (2005).