

## OPTIMIZATION, METAHEURISTICS AND EVOLUTIONARY ALGORITHMS IN CIVIL ENGINEERING

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### 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 optimization, metaheuristics and evolutionary algorithms in civil engineering. The communications must address metaheuristics, evolutionary algorithms and other optimization techniques, applied in solving optimum design problems in civil engineering and related topics [1]. 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, Evolution Strategies, Differential Evolution, etc. in addition to other metaheuristic paradigms such as Particle Swarm Optimization or Ant Colony Optimization.

Applications of these optimization methods and others (e.g. [2]), in civil engineering are welcomed, both for single-objective and multi-objective optimization problems [3,4]. Topics to be covered (but are not limited to) are: In the civil engineering area, contents related to structural design (e.g.: concrete and/or steel structures, etc.), geotechnics, acoustics, hydraulics, and infrastructure are welcome. In the construction management area, related content can be project management, planning, coordination and control of projects, reliability, cost and time management, among others. Development aspects such as including surrogate modeling, parallelization, hybridization, performance comparisons among methods, etc., are encouraged.

### REFERENCES

- [1] J. Magalhães-Mendes, D. Greiner, "Evolutionary Algorithms and Metaheuristics in Civil Engineering and Construction Management", Computational Methods in Applied Sciences, Springer, Vol. 39, 2015
- [2] P. Neittaanmäki, S. Repin, T. Tuovinen, "Mathematical Modeling and Optimization of Complex Structures", Computational Methods in Applied Sciences, Springer, Vol. 40, 2016.
- [3] C. Coello Coello, "Multi-objective Evolutionary Algorithms in Real-World Applications: Some Recent Results and Current Challenges", in: D. Greiner et al. (eds). Advances in Evolutionary and Deterministic Methods for Design, Optimization and Control in Engineering and Sciences. Computational Methods in Applied Sciences, Vol. 36, 2015.
- [4] V. Yepes, T. García-Segura, J.M. Moreno-Jiménez, "A cognitive approach for the multi-objective optimization of RC structural problems", Archives of Civil and Mechanical Engineering, Vol. 15, 2015.