Preface

This book contains book chapters from selected and extended contributions presented at the EUROGEN 2019 International Conference, that took place at the University of Minho at the historical town of Guimarães in the north of Portugal on September 12-14, 2019.

EUROGEN 2019 was the 13th of a series of International Conferences previously held in Las Palmas de Gran Canaria (1995), Trieste (1997), Jyväskylä (1999), Athens (2001), Barcelona (2003), Munich (2005), Jyväskylä (2007), Kracow (2009), Capua (2011), Las Palmas de Gran Canaria (2013), Glasgow (2015) and Madrid (2017) mainly focused on Evolutionary and Deterministic Computing for Industrial Applications. This conference aims at bringing together specialists from universities, research institutions and industries developing or applying evolutionary and deterministic methods in design optimization and control and emphasizing industrial and societal applications.

This series of conferences was originally launched by the EC –Strategic/Prospective Network INGENET in 1998. EUROGEN 2019 is, also, an ECCOMAS Thematic Conference also co-ordinated by the Special Interest Group (SIG) with ERCOFTAC (European Research Community on Flow, Turbulence and Combustion).

The conference included the following topics: metaheuristics and evolutionary algorithms, multi-objective evolutionary algorithms and constraint handling techniques, adjoint-based including one-shot methods, hybrid optimisation methods, high-performance computing, goal-oriented optimization for mesh and meshless methods, game strategies, surrogate models for optimisation, parallel and distributed evolutionary algorithms, multi-disciplinary optimization methods, design optimization under uncertainties, multi-criteria decision making and topology optimization.

EUROGEN 2019 beneficiated from the presentation of five keynote invited speakers: Kyriakos Giannakoglou from the National Technical University of Athens (NTUA), Greece; Maria João Alves from the University of Coimbra, Portugal; José Covas from the University of Minho, Portugal; Massimiliano Vasile from the University of Strathclyde, United Kingdom and Carlos Fonseca from the University of Coimbra, Portugal.

With a peer review selection procedure, within the 91 papers submitted from 17 countries, 29 were selected to be published in this volume, which has been organized in taking into account the following eleven (11) mini-symposia:

- Multi-fidelity, surrogate modelling and design exploration of real-world problems
- Recent Advances in Numerical Optimization and Optimal Control and its Applications
- Single and Multiobjective Bilevel Optimization
- Adjoint methods for Multi-physics, including Applications
- Design support tools in industrial and scientific applications
- EMO - Evolutionary Multi-Objective Optimization
- Optimization under Uncertainty
- Numerical simulation as a tool in product development for the industry
- Design of polymer processing equipment: numerical simulation and optimization
- Particle-based simulation
- Game Theory and Optimization: From Theory to Applications

These above Mini Symposia (MS) has been classified in two major components:

- Theoretical and Numerical Methods and Tools for Optimization and Control;
- Engineering Design and Societal Applications

We express our gratitude to the keynote speakers for accepting our invitation, to all authors who submitted their research and industrial contributions, to the International Corresponding Members and to the members of the European Technical Committee and of the Scientific Programme Committee.

Finally, the editors are indebted to Nathalie Jacobs and Eugenio Onate, ECCOMAS- Springer Manager and Director of this series continuously involved in the publication of books linked to EUROGEN and at last thank the Springer Manager line for assistance and patience in compiling this volume .

March 2020

António Gaspar-Cunha

Jacques Periaux

Nicolas R. Gauger

Kyriakos Giannakoglou

Domenico Quagliarella

David Greiner