

# Preface

In November 2014, as part of the activities for the celebration of the 50th Anniversary of the Ciudad Universitaria Jose Antonio Echeverria (CUJAE), where lies the largest technological University of Cuba, a work team, integrated by professors from CUJAE and IPRJ-UERJ of Brazil, organized the International Symposium of Mathematical Modeling applied to Engineering as part of the XVII International Convention of Engineering and Architecture, in Havana.

After a double peer review process, 65 articles were accepted for oral presentation in the Symposium. Taking into account the quality of the papers presented, the scientific committee of the Symposium decided to propose the edition of a book and performed a second round of selection in order to define those that would be chosen to compose it. The criteria used in this selection were three fundamentally:

1. The quality of the paper, taking into account the evaluation of the reviewers in the first round of review
2. Evaluation of the technical content by the book editors
3. Representation of different areas of engineering applications

Finally, 12 articles were selected, with the possibility of being expanded and published as chapters of the book. They cover applications in automation, biomedical, chemical, civil, electrical, electronic, geophysical, and mechanical engineering, showing the multidisciplinary application of the mathematical and computational modeling tools.

The primary differentiation and distinctive quality of this book is the wide variety of applications, mathematical and computational tools, and original results presented, all with rigorous mathematical procedures.

Furthermore, the authors from five countries and 16 different research centers contribute with their expertise in both the fundamentals and real problem applications, based upon their strong background on modeling and computational intelligence.

The following is a summary of the book's core topics:

- Rupture risk prediction of abdominal aorta aneurysm
- Computational modeling of cytoskeletal dynamics
- Fault diagnosis in industrial systems
- Parameters and uncertainties estimation in chemical processes
- Development of statistical and numerical strategies for computational cost reduction
- Reliability analysis of electrical generation-transmission systems
- Preconditioners for solving simulation problems
- Modeling of polymeric thin film transistors

The editors consider that this book is intended for use in graduate courses of engineering, applied mathematics, and applied computation, where tools as mathematical and computational modeling, numerical methods, and computational intelligence are intensively applied to the solution of real problems.

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