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Computational Methods for the Innovative Design of Electrical Devices

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Preface

This volume in the Studies in Computational Intelligence book series published by Springer includes the extended version of a number of selected papers presented at the International Symposium on Electromagnetic Fields in Electrical Engineering ISEF'09. The Symposium was jointly organized by the LSEE (Laboratory of Electrical Systems and Environment), University of Artois, France, and the Institute of Mechatronics and Information Systems, Technical University of Lodz, Poland. The venue was Arras, a beautiful historical town in the north of France.

The aim of ISEF symposia is to discuss recent developments in modelling and simulation, control systems, testing, measurements, monitoring, diagnostics and advanced software methodology and their applications in electrical and electronic devices and mechatronic systems. ISEF is a forum for electronic and electrical engineers, applied mathematicians, computer and software engineers, to exchange ideas and experiences ranging from fundamental developments of theory to industrial applications. The conference has become a popular event among academics, researchers and practising engineers. Due to discussions during the conference, it has been decided to prepare a book in the domain of innovative methods for the electrical machine design.

Over the past thirty-five years, ISEF has gained a prominent position in electromagnetic community. Since the first meeting held in Uniejow Palace near Lodz in 1974 – at that time organised as a National Symposium on "Electrodynamics of Transformers and Electrical Machines" – ISEF has travelled around Europe visiting, in addition to various venues in Poland, several interesting places such as Pavia (twice), Southampton, Thessaloniki, Maribor, Baiona, Prague, and finally Arras in 2009.

For the meeting in Arras, more than 300 papers had been submitted as digests, and after the reviewing process 276 papers were accepted for presentation at the Conference. Those versions were considered by session chairs for possible inclusion in the post-conference special issue. The programme of the conference included three invited papers, five oral and eight dialogue sessions. All well established conference topics were covered, and supplemented by two new areas:

- artificial and computational intelligence in electrical engineering,
- noise and vibration in electrical machines.

Another novelty was a special session with presentations by PhD students working in the field of electromagnetism.

The small but very active and prominent group of 'electromagneticians' regularly attending ISEF will hopefully continue to support future meetings, so providing a particular flavour and focus. However, it is also very pleasant to see other areas strongly emerging as new conference topics, in particular computer engineering, software methodology, CAD techniques, artificial intelligence and material sciences.

This special issue of Studies in Computational Intelligence incorporates 17 chapters selected by the Guest Editors as a result of a two-stage evaluation process: first, recommendations of the chairpersons of the sessions, and next, reviews by two independent referees. Computational and modelling aspects are the main ones, although design, measurement and performance issues are considered as well.

As the Editors of this special issue, we would like to express our thanks to Springer for giving us the opportunity to share the ISEF symposium with a wider community; thanks are due also to our colleagues, in particular Dr Stéphane Duchesne and Dr Jean-Philippe Lecointe for their help, efficiency and valuable contribution to the reviewing and editing process.

At the end of these remarks, let us thank our colleagues who have contributed to the book by peer-reviewing the papers at the conference as well as in the publishing process. We also convey our thanks to Springer for their effective collaboration in shaping this editorial enterprise. As ISEF symposia are organised biannually, we hope to keep our fruitful links with Springer in the future.

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Chairman of the ISEF Symposium

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Organizing Committee

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