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Selected Topics in Contemporary Mathematical Modeling 2021



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PREFACE

Every year since 2009 the Institute of Mathematics of the Czestochowa University of Technology in cooperation with the Czestochowa Branch of Polish Mathematical Society has been organizing successive conferences on Mathematical Modeling in Physics and Engineering. The topics of the conferences cover various aspects of mathematical modeling and the usage of computer methods in modern problems emerging in both these great fields of science and technology. Every time the conference participants represented a prominent group of recognized scientists as well as young researchers and Ph.D. students from domestic and foreign universities.

Last year due to the extraordinary situation related to the Covid-19 pandemic this series stopped. However, thanks to the mutual contacts between the participants of the previous conference events, the idea of publishing a monograph devoted to present-day advances in mathematical modeling aroused. As a result, several researchers from the Czestochowa University of Technology were asked to prepare a chapter summarizing their recent results and indicating contemporary mathematical modeling trends as seen from their perspective.

Throughout the centuries mathematical modeling helps scientists understand the mechanisms and dynamics underlying various physical and engineering phenomena. The range of possible problems within this area is immense as contemporary technology has numerous mathematical challenges. This book on Selected Topics in Contemporary Mathematical Modeling focuses on the improvements of known modeling approaches as well as some novel methods and concepts. It presents both formal-theoretical results and their new applications in various engineering areas. This volume comprises ten chapters that reflect the main thrust of research conducted in the Czestochowa University of Technology in this field and present the current frontiers of several important areas of applied mathematics.

I would like to express my gratitude and appreciation to the authors of the chapters included in this monograph for their very interesting contributions. Thanks to their help and excellent cooperation it was possible to provide an overview of such a broad range of topics in the great art of expressing complex real-world problems in the shape of tractable mathematical formulations, and thus pose the problems simply, precisely, and unambiguously.

Andrzej Z. Grzybowski

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