

ICIAM 2019 SEMA SIMAI Springer Series 14

René Pinnau
Nicolas R. Gauger
Axel Klar *Editors*

Modeling, Simulation and Optimization in the Health- and Energy-Sector



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The series is aimed at providing useful reference material to academic and researchers at an international level.

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Editors

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Preface

Mathematical modeling, simulation and optimization is nowadays successfully used in various fields of application, like the energy- or health-sector. Here, mathematics is often the driving force for new innovations and most relevant for the success of many interdisciplinary projects. The German Federal Ministry for Education and Research supports projects in this field in the framework of the program “Mathematics for Innovations”.

In this book, we present recent research work which has been collected from talks given in two minisymposia during the “International Congress on Industrial and Applied Mathematics” held in Valencia, 2019. Their main focus was on “Prognostic MR Thermometry for Thermal Ablation of Liver Tumours” and “Energy-Efficient High Temperature Processes via Shape Optimisation”, which are also interdisciplinary projects funded by the BMBF.

The following chapters show how mathematical models and tools can help to solve problems in these fields, always based on a synergetic collaboration with the practitioners from medicine and industry. The mathematical topics vary from optimization and inverse problems over shape optimization and algorithmic differentiation to model order reduction, here, in particular, for partial differential equations including radiation effects.

Kaiserslautern, Germany

René Pinnau
Nicolas R. Gauger
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