

# Preface

This book approaches the topic of “water systems” from the perspective of systems engineering and automation technology. Why is it worthwhile to devote an entire book to this approach?

Currently, the efficient use of water resources is rapidly gaining importance in all parts of the world. The drivers of this development are diverse. Here it is worth mentioning the rapid economic growth in some parts of the world, e.g. in Asia and the increasing trend towards urbanization, which is most apparent in the growth of existing and in the emergence of new megacities. The contributions of the climatic changes with the intensification of extremes, such as floods and droughts are also important. These challenges require undoubtedly interdisciplinary efforts of politicians, scientists, and technicians.

A contribution can therefore be made by technologies that support people in making decisions relating to the operation of water systems and in dealing with special situations or automatically control the water systems. Due to the often very high complexity of the considered systems—resulting not least from the necessary holistic approach—optimal solutions can only be found on the basis of simulation models.

The focus of this book is on the introduction of approaches to the modeling of the different parts of the water cycle. These approaches are designed for use in decision-making systems and automatic control and are characterized by low complexity and simulation times, so that they can be used in real-time applications for computing optimal actions or control strategies.

Thus, these models differ from the detailed physical model approaches commonly used in hydrology or hydraulic. The approaches presented in this book are based on simplifications, which are justified by their applications in decision-making or for automatic control and offer several benefits for these purposes.

In addition to the models, their integration and usage in decision support systems are shown and several application examples are given.

As an editor I would like to thank the authors who made this book possible. On their behalf, I would like to thank the publishers for their excellent support and advice in the creation of the book.

Ilmenau  
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Making Tasks

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