

E. Holzbecher

Environmental Modeling

Using MATLAB

 Springer



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Environmental Modeling

Using MATLAB®

*Dedicated to my wife Susanna
and my children Gera and Gero*

With 148 Figures and 18 Tables

Library of Congress Control Number: 2007029736

ISBN 978-3-540-72936-2 Springer Berlin Heidelberg New York

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Typesetting by the author and printer, using a Springer L^AT_EX macro package

Cover design: deblik, Berlin

Printed on acid-free paper SPIN 11331236 3-540-72936-2

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Preface

“Environmental Modeling using MATLAB® ” by Ekkehard Holzbecher is an excellent publication and a novel approach covering the intersection of two important, growing worlds – the world of environmental modeling and of mathematical software.

Environmental modeling is a science that uses mathematics and computers to simulate physical and chemical phenomena in the environment (e.g., environmental pollution). This science was initially based on pen-and-paper calculations using simple equations. In the last 50 years, with the development of digital computers, environmental models have become more and more complex, requiring often numerical solutions for systems of partial differential equations.

Mathematical software, such as MATLAB®, has been developed in the last two decades. These packages have been particularly successful for users of personal computers. Mathematical software provides a set of tools for solving equations both analytically and numerically. This is a major improvement in comparison to the programming tools (e.g., FORTRAN) previously used by scientists. Mathematical software offers extremely valuable and cost-effective tools that improve the productivity of the programmer by at least an order of magnitude. The use of these tools also minimizes the risk of programming errors. In addition, mathematical software offers unique visualization tools that allow the user to immediately visualize and often animate simulation results.

Scientists who become familiar with a tool like MATLAB® will never go back to previous ways of computer programming.

The book “Environmental Modeling using MATLAB® ” provides a clear, comprehensive, and very instructive introduction to the science of environmental modeling, and more importantly, includes the MATLAB® codes for the actual solutions to the environmental equations. MATLAB® codes are listed in the book and also included as more complete versions in an attached CD.

I highly recommend this book to both beginners and expert environmental professionals. The book will be particularly useful to those scientists who have postponed the learning and using mathematical software. This book will open a new world to them!

Paolo Zannetti

President, The EnviroComp Institute

Editor of Book Series on Environmental Modeling

Foreword

The book

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- B. to exer

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