

# Preface

Usually, the subject of a book on numerical mathematics pertains to a certain field of application or a certain numerical method. In this book we proceed in a different way. Stability is a concept that appears in various fields of numerical mathematics (as well as in other parts of mathematics). Although in each subfield stability is defined differently, there is a common meaning for this term, roughly described by the fact that perturbations are not amplifying the result in a dangerous way. In examining different fields of numerical mathematics concerning stability, we have the opportunity to recall some facts from numerical analysis. However, numerical mathematics cannot control stability exclusively for its own purpose. It turns out that stability is an ambiguous term, which also has strong connections to analysis and functional analysis.

Although stability is an essential requirement for numerical methods, the particular stability conditions are often not as obvious as, e.g., consistency conditions. The book may lead the reader to a better understanding of this term.

This book is an extension of a lecture held in the summer semester of 2003 at the University of Kiel (Christian-Albrechts-Universität zu Kiel). The exposition is self-contained, and the necessary facts from numerical analysis and analysis are provided. Hence, the book is well suited, e.g., as material for seminars in numerical mathematics.

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