Preface

Ten years after the 1st edition, it was time to update, extend and reorganize the material. The book still gives an introduction to modern ship hydrodynamics, which is in my opinion suitable for teaching at a senior undergraduate level or even at a postgraduate level. It is thus also suitable for engineers working in industry. The book assumes that the reader has a solid knowledge of general fluid dynamics. In teaching, general fluid dynamics and specific ship hydrodynamics are often mixed but I believe that universities should first teach a course in general fluid dynamics which should be mandatory to most engineering students. There are many good textbooks on the market for this purpose. Naval architects should then concentrate on the particular aspects of their field and cover material more suited to their needs. This book is organized to support such a strategy in teaching.

The first chapter covers basics of computational fluid dynamics and model tests, and Chapters 2 to 6 cover the four main areas of propeller flows, resistance and propulsion, ship seakeeping including ship vibrations, and maneuvering. Chapter 5 was added to cover ship vibrations from a hydrodynamic point, as a natural extension of rigid-body motions in waves in seakeeping. It is recommended that this sequence be followed in teaching. The book tries to find a suitable balance for practical engineers between facts and minimizing formula work. However, there are still formulae. These are intended to help those tasked with computations or programming. Readers with a practical interest may simply skip these passages. Readers with a more theoretical interest will find additional background, e.g. derivations of formulae, on the associated website.

The final two chapters of the 1st edition involved more extensive background on boundary element methods. They were intended for graduate and postgraduate teaching. Research is no longer active in these methods and more modern field methods are covered in standard textbooks. The original two chapters on boundary element theory are now still available but only as appendices to this book.

The book is supplemented by exercises and solutions, formula derivations and texts, intended to support teaching or self studies. The material can be downloaded from www.bh.com/companions/0750648511.

This book is based largely on lectures for German students. The nucleus of the book was formed by lectures on ship seakeeping and ship maneuvering, which I have taught for several years with Professor Heinrich Söding. I always felt that we should have a comprehensive textbook that would also cover resistance and propulsion, as ship seakeeping and maneuvering are both interwoven strongly with the steady base flow. Many colleagues helped with providing material, allowing me to pick the best from their teaching approaches. A lot of material was written and compiled in a new way, inspired by these sources, but the chapters on ship seakeeping and maneuvering use extensive existing material. For this 2nd edition, material on ship vibrations, propulsion-improving devices, and simple design approaches were added. Also, CFD has progressed significantly over the past decade and required updating of pertaining passages. Readers interested in marine CFD applications may see the latest progress in the proceedings of the Numerical Towing Tank Symposium, a conference series that I initiated for faster dissemination of research results in this field. The proceedings can be downloaded from www.uni-due.de/IST/ismt_nutts8.

Thanks are due to Seehafen-Verlag Hamburg for permission to reprint text and figures from the *Manoeuvring Technical Manual*, an excellent book unfortunately no longer in print. Thanks are due to Hansa-Verlag Hamburg for permission to reprint text and figures from German contributions in *Handbuch der Werften XXIV*. Thanks are also due to Germanischer Lloyd for permission to reprint text and figures from its GL Technology on ship vibrations.

Countless colleagues supported the endeavor of writing this book by supplying material, proof-reading, making comments, or just discussing engineering or didactic matters. Among these are (in alphabetical order) Poul Andersen, Kai Graf, Mike Hughes, Hidetsugu Iwashita, Gerhard Jensen, Meinolf Kloppenburg, Maurizio Landrini, Jochen Laudan, Eike Lehmann, Friedrich Mewis, Holger Mumm, Prasanta Sahoo, Katsuji Tanizawa, Gerhard Thiart, Michel Visonneau, and Hironori Yasukawa. Special thanks to Dodo Wagener for all the great artwork. Most of all, Professor Heinrich Söding has supported this book to an extent that he should have been named as co-author, but, typically for him, he declined the offer. He even refused to allow me to dedicate this book to him. I then dedicate this book to the best mentor I ever had, a role model as a scientist and a man, so much better than I will ever be. You know who.

Volker Bertram