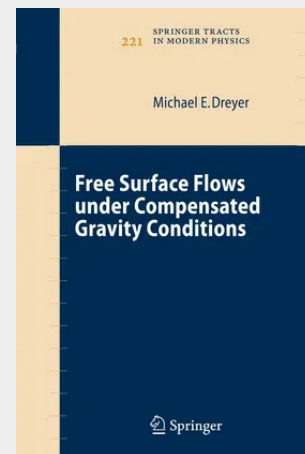


Free Surface Flows under Compensated Gravity Conditions

This book considers the behavior of fluids in a low-gravity environment (e.g. spacecraft) with special emphasis on application in PMD (propellant management device) systems. Since PMD designs are not testable on ground and thus completely rely on analytical or numerical concepts, this book treats three different flow problems with analytical, numerical and experimental means. These problems are linked together by the same set of equations and boundary conditions.

The work described in this book was performed during my employment at the Center of Applied Space Technology and Microgravity (ZARM) of the University of Bremen in the years 1994 to 2006. Some of the results were published in papers and reports by (in alphabetical order) Jens Gerstmann, Mark Michaelis, Antje Ohlho?, Uwe Rosendahl, Michael Stange, Gerrit Wolk, and myself. The contents of these papers are partly included in this work to make it a thorough and comprehensive document. I am very grateful to my colleagues since this book would have never been possible without their cooperation. First of all I would like to express my gratitude to the head of ZARM, the chair for mechanics and fluid mechanics in the faculty of production - engineering and technology of the University of Bremen, Prof. Dr.-Ing. Hans J. Rath, who gave me the freedom and the possibilities to perform this work. Furthermore, I acknowledge with great pleasure the cooperation with my colleagues (in alphabetical order) Dr. Volker Baumbach, Dr. Christian Berg, Frank Ciecior, Dennis Haake, Dr. Armin de Lazzer, Holger Faust, Carsten Fechtmann, Dr. Jens Gerstmann, Dr. Aleksander Grah, Dennis Haake, Prof. Dieter Langbein, Ronald Mairose, Dr. Mark Michaelis, Dr. Karine Odic, Dr. Antje Ohlho?, Peter Prengel, Uwe Rosendahl, Dr. Uwe Schmid, Markus Stadlander, Dr. Michael Stange, Malte Stief, and Dr. Gerrit Wolk.



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