Mitigation of Hydrodynamic Resistance

Methods to Reduce Hydrodynamic Drag

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Marc Perlin • Steven Ceccio

University of Michigan, USA

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To Terry and Martha

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Preface

This text is written for scientists and engineers who are interested in various aspects of, and techniques to reduce the drag forces on objects moving at or below a liquid surface. Although there is a combination of experimental, numerical, and analytical material presented, the dominant focus is experimental in nature. Numerical investigations have aided understanding of the underlying physical mechanisms associated with flow induced skin friction and its reduction; however, numerical efforts are often limited by the computational resources needed to simulate large Reynolds number flows at large scales. That is, a typical surface ship in the ocean environment operates at Reynolds numbers of about 10^9 with lengths of 100 m or more, hence the focus on experiments. As always, the best approach is a thoughtful combination of experiment, computation, and analysis.

Senior undergraduate students who have successfully completed a course or more in fluid mechanics and graduate students, who have done likewise, can master the material in this book. Practicing engineers who desire knowledge in this area will also find the material acceptable and useful as well as easily grasped and mastered.

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