

### Mitigation of Hydrodynamic Resistance:Methods to Reduce Hydrodynamic Drag

Marc Perlin, Steven Ceccio



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This text presents the state of the art in friction drag/resistance reduction technologies for BODIES and crafts operating in liquids at and beneath the free surface. It is useful for professionals with backgrounds in advanced fluid dynamics as well as by academics teaching introductory graduate courses in this area. Active control of resistance will include a discussion of friction reduction, for example through the injection of gas that can form air layers and polymers that initially reside adjacent to the hull, including the use of partial and super cavities. The book discusses passive resistance control achieved through changes in the overall hull shape and appendages, including the application of lifting bodies, bulbous bows, and stern flaps. It also addresses passive reduction of skin friction through the application of hull coatings and other elements of hull husbandry.

#### **Contents:**

- Introduction
- Active Techniques:
  - Modification of Drag by Polymer Injection
  - Friction Drag Reduction by Bubble/Gas Injection
  - Transition from BDR and Air Layer Drag Reduction
  - Friction Drag Reduction by Partial Air Cavities or PCDR
- Passive Techniques:
  - Drag Reduction by Super and Partial Cavities
  - Super-Hydrophobic Surfaces and Coatings
  - Passive Resistance-Mitigation by Appendages: Bulbous Bows, Stern Flaps and Wedges, and Lifting Bodies

**Readership:** Professionals, academics, researchers, and graduate students in ocean engineering, mechanical engineering, fluid mechanics and tribology.

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