



# Robust Control of Diesel Ship Propulsion

By Nikolaos Xiros

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Based on the author's research and practical projects, he presents a broad view of the needs and problems of the shipping industry in this area. The book covers several models and control types, developing an integrated nonlinear state-space model of the marine propulsion system.

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## Robust Control of Diesel Ship Propulsion By Nikolaos Xiros Bibliography

- Sales Rank: #5502428 in Books
- Published on: 2002-08-05
- Original language: English
- Number of items: 1
- Dimensions: 6.14" h x .63" w x 9.21" l, 1.12 pounds
- Binding: Hardcover
- 226 pages

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## **Editorial Review**

### **From the Back Cover**

The control of marine engines and propulsion plants is a field of increasing interest to the maritime industry. The author's participation in a number of closely related research projects together with practical shipboard experience allows *Robust Control of Diesel Ship Propulsion* to present a broad view of the needs and problems of the shipping industry in this area.

The book covers a number of models and control types: An integrated nonlinear state-space model of the marine propulsion system is developed. This is based upon physical principles that incorporate uncertainties due to engine thermodynamics and disturbances due to propeller hydrodynamics. The model employs artificial neural nets for depicting the nonlinearities of the thermochemical processes of engine power/torque generation and the engine-turbocharger dynamical interaction; neural nets combine the required mathematical flexibility and formalism with numerical training and calibration options using either thermodynamic engine models or measured data series. The neural state-space model is decomposed appropriately to provide a linearised perturbation model suitable for controller synthesis.

The proportional integral (derivative) control law is examined under the perspective of shaft speed regulation for enhanced disturbance rejection of the propeller load. The typical marine shafting system dynamics and configuration allow for a smart implementation of the D-term based on shaft torque feedback.

Full-state feedback control is, examined for increased robustness of the compensated plant against parametric uncertainty and neglected dynamics. The  $H$ -infinity requirements on the closed-loop transfer matrix are appropriately decomposed to similar ones on scalar transfer functions, which give specifications which are easier to manipulate.

In effect, the methods are comparatively assessed and suggestions for extensions and practical applications are given. This synthetic approach to the propulsion plant control and operational problems should prove useful for both theoreticians and practitioners, and can be easily adopted for the control of other processes or systems outside the marine field, as well.

## **Users Review**

### **From reader reviews:**

#### **Willard Callahan:**

The experience that you get from Robust Control of Diesel Ship Propulsion will be the more deep you rooting the information that hide in the words the more you get interested in reading it. It does not mean that this book is hard to understand but Robust Control of Diesel Ship Propulsion giving you joy feeling of reading. The author conveys their point in a number of way that can be understood by simply anyone who read that because the author of this reserve is well-known enough. This book also makes your own vocabulary increase well. It is therefore easy to understand then can go with you, both in printed or e-book style are available. We suggest you for having this particular Robust Control of Diesel Ship Propulsion instantly.

**Travis Freeman:**

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**Jean Hogue:**

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**Juan Gilbert:**

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