

Full Scale Validation Of Cfd Model Of Self Propelled Ship

J. Longo, Frederick Stern (Professor of engineering)

Selected Papers from the Sixth International Symposium on Marine Propulsors Sverre Steen ,Kourosh Koushan,2020-12-29 Marine propulsors are key components of the many thousands of ships and boats operating in oceans, lakes, and rivers around the world. The performance of propulsors are important for the environmental impact of ships, underwater noise impact on aquatic fauna, and crew and passenger comfort and safety. This book presents nineteen papers devoted to the hydrodynamics of different types of marine propulsors (conventional propellers, thrusters, and novel solutions). Most of the papers are extended papers from the sixth International Symposium on Marine Propulsors (SMP 2019). Several of the papers deal with cavitation, vortices, and energy saving devices. The papers present high-quality research performed using Computational Fluid Dynamics (CFD) and Experimental Fluid Dynamics (EFD) as well Artificial Intelligence (AI).

HSMV 2023 E. Begovic,2023-11-09 A growing awareness for sustainable mobility and the importance of reducing greenhouse gas emissions call for immediate action in the maritime industry. Technical improvements, such as the hydrodynamic optimization, innovations in energy saving devices, new propulsion systems and power supplies can contribute to such achievements. This challenge is even more demanding for high speed marine craft. This book presents the proceedings of HSMV2023, the 13th International Symposium on High Speed Marine Vehicles, held from 23 to 25 October 2023 in Naples, Italy. The conference attracts academics, researchers, designers, operators and shipowners. It provides a platform for the presentation and discussion of developments in the design, construction and operation of high speed marine vessels. More than 40 submissions were received; 27 papers were selected for presentation and publication in this book after a rigorous review process. The book provides an overview of current innovations and developments, and can be a reference for all those working in the field of high-speed marine vehicles.

Evaluation of Surface-ship Resistance and Propulsion Model-scale Database for CFD Validation J. Longo, Frederick Stern (Professor of engineering),1995

Technical Note J. Longo,1996

Practical Design of Ships and Other Floating Structures Tetsuo Okada,Katsuyuki Suzuki,Yasumi Kawamura,2020-10-05

This book gathers the peer-reviewed proceedings of the 14th International Symposium, PRADS 2019, held in Yokohama, Japan, in September 2019. It brings together naval architects, engineers, academic researchers and professionals who are involved in ships and other floating structures to share the latest research advances in the field. The contents cover a broad range of topics, including design synthesis for ships and floating systems, production, hydrodynamics, and structures and materials. Reflecting the latest advances, the book will be of interest to researchers and practitioners alike.

Practical Ship Hydrodynamics Volker Bertram,2012 Practical Ship Hydrodynamics provides a comprehensive overview of hydrodynamic experimental and numerical methods for ship resistance and propulsion, maneuvering, seakeeping and vibration. Beginning with an overview of problems and approaches, including the basics of modeling and full scale testing, expert author Volker Bertram introduces the marine applications of computational fluid dynamics and boundary element methods. Expanded and updated, this new edition includes: Otherwise disparate information on the factors affecting ship hydrodynamics, combined to provide one practical, go-to resource. Full coverage of new developments in computational methods and model testing techniques relating to marine design and development. New chapters on hydrodynamic aspects of ship vibrations and hydrodynamic options for fuel efficiency, and increased coverage of simple design estimates of hydrodynamic quantities such as resistance and wake fraction. With a strong focus on essential background for real-life modeling, this book is an ideal reference for practicing naval architects and graduate students.

Numerical Ship Hydrodynamics Lars Larsson,Frederick Stern,Michel Visonneau,2013-09-30 This book assesses the state-of-the-art in computational fluid dynamics (CFD) applied to ship hydrodynamics and provides guidelines for the future developments in the field based on the Gothenburg 2010 Workshop. It presents ship hull test cases, experimental data and submitted computational methods, conditions, grids and results. Analysis is made of errors for global (resistance, sinkage and trim and self-propulsion) and local flow (wave elevations and mean velocities and turbulence) variables, including standard deviations for global variables and propeller modeling for self-propulsion. The effects of grid size and turbulence models are evaluated for both global and local flow variables. Detailed analysis is made of turbulence modeling capabilities for capturing local flow physics. Errors are also analyzed for head-wave seakeeping and forward speed diffraction, and calm-water forward speed-roll decay. Resistance submissions are used to evaluate the error and uncertainty by means of a systematic verification and validation (V&V) study along with statistical investigations. Post-workshop experimental and computational studies are conducted and analyzed for evaluation of facility biases and to draw more concrete conclusions regarding the most reliable turbulence model, appropriate numerical methods and grid resolution requirements, respectively.

Advances in Maritime Technology and Engineering Carlos Guedes Soares,Tiago A. Santos,2024-05-08 Advances in Maritime Technology and Engineering comprises a collection of the papers presented at the 7th International Conference on

Maritime Technology and Engineering (MARTECH 2024) held in Lisbon, Portugal, on 14-16 May 2024. This Conference has evolved from the series of biannual national conferences in Portugal, which have become an international event, reflecting the internationalization of the maritime sector and its activities. MARTECH 2024 is the seventh of this new series of biannual conferences. This book comprises 142 contributions that were reviewed by an International Scientific Committee. *Advances in Maritime Technology and Engineering* is dedicated to maritime transportation, ports as well as maritime safety and reliability. It further comprises sections dedicated to ship design, cruise ship design, and to the structural aspects of ship design, such as ultimate strength and composites, subsea structures as pipelines, and to ship building and ship repair. The *Proceedings in Marine Technology and Ocean Engineering* series is dedicated to the publication of proceedings of peer-reviewed international conferences dealing with various aspects of “Marine Technology and Ocean Engineering”. The series includes the proceedings of the following conferences: the International Maritime Association of the Mediterranean (IMAM) conferences, the Marine Structures (MARSTRUCT) conferences, the Renewable Energies Offshore (RENEW) conferences and the Maritime Technology (MARTECH) conferences. The “Marine Technology and Ocean Engineering” series is also open to new conferences that cover topics on the sustainable exploration of marine resources in various fields, such as maritime transport and ports, usage of the ocean including coastal areas, nautical activities, the exploration and exploitation of mineral resources, the protection of the marine environment and its resources, and risk analysis, safety and reliability. The aim of the series is to stimulate advanced education and training through the wide dissemination of the results of scientific research.

Efficient Full Scale CFD for Ship Hydrodynamics Michal Orych,2024

Twenty-First Symposium on Naval Hydrodynamics National Research Council,Division on Engineering and Physical Sciences,Commission on Physical Sciences, Mathematics, and Applications,Naval Studies Board,1997-09-11

Trends in Maritime Technology and Engineering C. Guedes Soares,T.A. Santos,2022-06-07 Trends in Maritime Technology and Engineering comprises the papers presented at the 6th International Conference on Maritime Technology and Engineering (MARTECH 2022) that was held in Lisbon, Portugal, from 24-26 May 2022. The Conference has evolved from the series of biennial national conferences in Portugal, which have become an international event, and which reflect the internationalization of the maritime sector and its activities. MARTECH 2022 is the sixth of this new series of biennial conferences. The book covers all aspects of maritime activity, including in Volume 1: Structures, Hydrodynamics, Machinery, Control and Design. In Volume 2: Maritime Transportation and Ports, Maritime Traffic, Safety, Environmental Conditions, Renewable Energy, Oil & Gas, and Fisheries and Aquaculture. Trends in Maritime Technology and Engineering aims at academics and professionals in the above mentioned fields.

Validation of CFD-MBD FSI for High-fidelity Simulations of Full-scale WAM-V Sea-trials with Suspended Payload Michael Anthony Conger,2015 High-fidelity CFD-MBD FSI (Computational Fluid Dynamics - Multi Body Dynamics

Fluid-Structure Interaction) code development and validation by full-scale experiments is presented, for a novel hull form, WAM-V (Wave Adaptive Modular Vessel). FSI validation experiments include cylinder drop with suspended mass and 33 ft WAM-V sea-trials. Calm water and single-wave sea-trials were with the original suspension, while the rough-water testing was with a second generation suspension. CFDShip-Iowa is used as CFD solver, and is coupled to Matlab Simulink MBD models for cylinder drop and second generation WAM-V suspension. For 1DOF cylinder drop, CFD verification and validation (V&V) studies are carried out including grid and time-step convergence. CFD-MBD results for 2DOF cylinder drop show that 2-way coupling is required to capture coupled physics. Overall, 2-way results are validated with an overall average error value of $E=5.6\%DR$ for 2DOF cylinder drop. For WAM-V in calm water, CFD-MBD 2-way results for relative pod angle are validated with $E=14.2\%DR$. For single-wave, CFD-MBD results show that 2-way coupling significantly improves the prediction of the peak amplitude in pontoon motions, while the trough amplitudes in suspension motions are under-predicted. The current CFD-MBD 2-way results for single-wave are validated with $E=17\%DR$. For rough-water, simulations are carried out in regular head waves representative of the irregular seas. CFD-MBD 2-way results are validation with $E=23\%D$ for statistical values and the Fourier analysis results, which is reasonable given the differences between simulation waves and experiments.

Ship Resistance and Propulsion Anthony F. Molland, Stephen R. Turnock, Dominic A. Hudson, 2011-08-08 Written by experts in the ship design field, this book provides a comprehensive approach to evaluating ship resistance and propulsion.

Sustainable Development and Innovations in Marine Technologies Petar Georgiev, Carlos Guedes Soares, 2019-08-22 Sustainable Development and Innovations in Marine Technologies includes the papers presented at the 18th International Congress of the Maritime Association of the Mediterranean (IMAM 2019, Varna, Bulgaria, 9-11 September 2019). Sustainable Development and Innovations in Marine Technologies includes a wide range of topics: Aquaculture & Fishing; Construction; Defence & Security; Design; Dynamic response of structures; Degradation/ Defects in structures; Electrical equipment of ships; Human factors; Hydrodynamics; Legal/Social aspects; Logistics; Machinery & Control; Marine environmental protection; Materials; Navigation; Noise; Non-linear motions - manoeuvrability; Off-shore and coastal development; Off-shore renewable energy; Port operations; Prime movers; Propulsion; Safety at sea; Safety of Marine Systems; Sea waves; Seakeeping; Shaft & propellers; Ship resistance; Shipyards; Small & pleasure crafts; Stability; Static response of structures; Structures, and Wind loads. The IMAM series of Conferences started in 1978 when the first Congress was organised in Istanbul, Turkey. IMAM 2019 is the eighteenth edition, and in its nearly forty years of history, this biannual event has been organised throughout Europe. Sustainable Development and Innovations in Marine Technologies is essential reading for academics, engineers and all professionals involved in the area of sustainable and innovative marine technologies.

Development and Validation of Computational Ship Hydrodynamics, 2003 As outlined in the grant proposal for the current project, Reference /1/, the overall technical objective for the current project was to investigate the maneuvering characteristics of a displacement vessel using the RANS code CFDSHIP-IOWA, with emphasis on the hull-rudder-propeller interaction. The numerical model was to be used to evaluate maneuvering characteristics by numerically performing the tests otherwise included in a physical Planar Motion Mechanism (PMM) test. At Force Technology - Division for Maritime Industry (formerly Danish Maritime Institute) experimental procedures and methods for analyzing model scale test results and extrapolation to full scale have been established over a 35-year period. Good general and detailed knowledge of maneuvering characteristics have consequently been gained during this period. It is recognized, however, that experimental work is both time-consuming and expensive when small alterations to an existing design are made during optimization of the maneuverability of a ship. In addition, PMM testing does not provide detailed knowledge of the flow regimes inducing the measured integral level forces. Since numerical procedures address both of these concerns Computational Fluid Dynamics (CFD) has been considered as an alternative to experimental work. CFD, has not, however, readily provided a tool for assessing maneuvering characteristics. To improve on this situation DMI initiated an R & D effort to develop methods in CFD to assess some of the basic hydrodynamic derivatives for a maneuvering ship.

Twenty-Second Symposium on Naval Hydrodynamics National Research Council, Naval Surface Warfare Center, Carderock Division, Office of Naval Research, Division on Engineering and Physical Sciences, Commission on Physical Sciences, Mathematics, and Applications, Naval Studies Board, 2000-03-02 The Twenty-Second Symposium on Naval Hydrodynamics was held in Washington, D.C., from August 9-14, 1998. It coincided with the 100th anniversary of the David Taylor Model Basin. This international symposium was organized jointly by the Office of Naval Research (Mechanics and Energy Conversion S&T Division), the National Research Council (Naval Studies Board), and the Naval Surface Warfare Center, Carderock Division (David Taylor Model Basin). This biennial symposium promotes the technical exchange of naval research developments of common interest to all the countries of the world. The forum encourages both formal and informal discussion of the presented papers, and the occasion provides an opportunity for direct communication between international peers.

CFD for Wind and Tidal Offshore Turbines Esteban Ferrer, Adeline Montlaur, 2015-06-09 The book encompasses novel CFD techniques to compute offshore wind and tidal applications. Computational fluid dynamics (CFD) techniques are regarded as the main design tool to explore the new engineering challenges presented by offshore wind and tidal turbines for energy generation. The difficulty and costs of undertaking experimental tests in offshore environments have increased the interest in the field of CFD which is used to design appropriate turbines and blades, understand fluid flow physical phenomena associated with offshore environments, predict power production or characterise offshore environments,

amongst other topics.

Full-scale Unsteady RANS CFD Simulations of Ship Behaviour and Performance in Head Seas Due to Slow Steaming,2015

Marine Design XIII, Volume 2 Pentti Kujala,Liangliang Lu,2018-06-04 This is volume 2 of a 2-volume set. Marine Design XIII collects the contributions to the 13th International Marine Design Conference (IMDC 2018, Espoo, Finland, 10-14 June 2018). The aim of this IMDC series of conferences is to promote all aspects of marine design as an engineering discipline. The focus is on key design challenges and opportunities in the area of current maritime technologies and markets, with special emphasis on:

- Challenges in merging ship design and marine applications of experience-based industrial design
- Digitalisation as technological enabler for stronger link between efficient design, operations and maintenance in future
- Emerging technologies and their impact on future designs
- Cruise ship and icebreaker designs including fleet compositions to meet new market demands

To reflect on the conference focus, Marine Design XIII covers the following research topic series:

- State of art ship design principles - education, design methodology, structural design, hydrodynamic design;
- Cutting edge ship designs and operations - ship concept design, risk and safety, arctic design, autonomous ships;
- Energy efficiency and propulsions - energy efficiency, hull form design, propulsion equipment design;
- Wider marine designs and practices - navy ships, offshore and wind farms and production.

Marine Design XIII contains 2 state-of-the-art reports on design methodologies and cruise ships design, and 4 keynote papers on new directions for vessel design practices and tools, digital maritime traffic, naval ship designs, and new tanker design for arctic. Marine Design XIII will be of interest to academics and professionals in maritime technologies and marine design.

Technology and Science for the Ships of the Future E. Rizzuto,V. Ruggiero,2022-09-29 The oceans are a key resource for transportation, energy and material extraction, and food production, representing one of the most important environments on the planet. Technological developments enabling us to exploit marine resources in a sustainable way are therefore of the greatest importance. This book presents the proceedings of the NAV 2022 conference, held in Genoa and La Spezia, Italy, from 15 to 17 June 2022. The conference is held every 3 years, attracting specialists in marine technology from all over the world. NAV 2022 was the 20th edition of the conference, and covered a full spectrum of maritime technology themes, all related to the exploitation of sea resources. The book contains 87 scientific papers, covering subjects ranging from comfort on board; to conceptual and practical ship design; deep sea mining and marine robotics; protection of the environment; renewable marine energy; design and engineering of offshore vessels; digitalization and cyber security; unmanned vehicles; yacht and pleasure craft design, and inland-waterway vessels. Providing a comprehensive coverage of the latest scientific and technical maritime issues, the book will be of interest to all those involved in this vital global industry.

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