

Performance by Design

**Hydrodynamics for
High-Speed Vessels**



Donald L Blount

Performance By Design Hydrodynamics For High Speed Vessels

Jialun Liu



Performance By Design Hydrodynamics For High Speed Vessels:

Performance by Design Donald L. Blount, 2014-10-30 Although the primary audience for this book is undergraduate university students studying naval architecture and marine engineering the content will certainly be of interest to most designers working with high speed craft Author Donald L Blount says My intent has been to share the technical information decision criteria rules of thumb and the opinionated experiences which have helped me in making choices for developing marine craft intended to operate beyond displacement speeds According to Blount Chapter One is a reprise of his article Original Speed Professional BoatBuilder magazine June July 2008 followed by nine chapters of science my skewed views of science a few things I don't understand definitions of things on which no two naval architects will agree design criteria which have been my friend and guidance on design procedures embracing technology This book also includes numerous graphs charts tables and formulas to clarify the material in the text He encourages you to personalize your copy with your own notes to make it even more valuable as a reference source and has included ample space for adding comments ABOUT THE AUTHOR Donald L Blount is the founder of Donald L Blount and Associates Inc Chesapeake Virginia During his 50 plus year career he has designed numerous noteworthy vessels including the 67.7 m 222 ft Destriero which holds the non refueled Atlantic crossing record set in 1992 with an average speed of 53.1 knots earning the coveted Blue Ribband shown here Registered as a professional engineer in two states Blount is a fellow of both SNAME and RINA He has served as Head of the Department of the U S Navy's Combatant Craft Engineering Department and also was employed at the David Taylor Model Basin He has co authored more than 50 papers and articles

Performance by Design Donald L. Blount, 2018 **High Speed Catamarans and Multihulls** Liang Yun, Alan Bliault, Huan Zong Rong, 2018-10-29 High speed catamaran and multihull high speed marine vessel have become very popular in the last two decades The catamaran has become the vessel of choice for the majority of high speed ferry operators worldwide There have been significant advances in structural materials and structural design has been combined with higher power density and fuel efficient engines to deliver ferries of increasing size The multihull has proven itself to be a suitable configuration for active power projection across oceans as well as for coastal patrol and protection operating at high speed for insertion or retrieval with a low energy capability At present there is no easily accessible material covering the combination of hydrodynamics aerodynamics and design issues including structures powering and propulsion for these vehicles Coverage in High Speed Catamarans and Multihulls includes an introduction to the history evolution and development of catamarans followed by a theoretical calculation of wave resistance in shallow and deep water as well as the drag components of the multihull A discussion of vessel concept design describing design characteristics empirical regression for determination of principal dimensions in preliminary design general arrangement and methods is also included The book concludes with a discussion of experimental future vehicles currently in development including the small waterplane twin hull vessels wave piercing catamarans planing catamarans tunnel planing

catamarans and other multihull vessels **Air Lubricated and Air Cavity Ships** Gennadiy Alexeevitch Pavlov, Liang Yun, Alan Bliault, Shu-Long He, 2020-03-28 Air Lubrication and Air Cavity Technology is a major development that has emerged in recent years as a means to reduce resistance and powering for many types of ships and an efficient design for high speed marine vessels This book introduces the mechanisms for boundary layer drag reduction and concepts studied in early research work Air bubble and sheet lubrication for displacement vessels is outlined and the key projects introduced Generation of low volume flow air cavities under the hull of displacement semi displacement and planing vessels are introduced together with theoretical and empirical analysis and design methods Resistance reduction power reduction and fuel efficiency are covered for both displacement and high speed vessels Air layer and air cavity effects on vessel static and dynamic stability are covered linked to regulatory requirements such as IMO Seaway motions and reduced impact load of high speed craft in waves are discussed including model test results Integration of propulsion systems for optimum powering is summarized A design proposal for a wave piercing air cavity craft is included in an appendix A comprehensive listing of document resources and internet locations is provided for further research **The Science of Sailing: A complete guide to the physics of sailing and the naval architecture governing the performance of sailing yachts** Peter van Oossanen, 2020-01-01 Part 4 of the Science of Sailing addresses the phenomena and drag arising from the air water interface experienced by sailing craft The topics that are dealt with are wave causation and its consequences on drag the properties of regular waves in deep and shallow water the wave pattern generated by the hull of sailing craft wave drag interference of wave systems running trim and sinkage rise breaking waves spray wind generated waves and spectra motions displayed by sailing yachts wave added drag surfing behaviour cavitation and ventilation **Performance, Technology and Application of High Performance Marine Vessels Volume One** Raju Datla, Xinfu Yang, Liang Yun, 2019-01-18 There has been tremendous growth in the development of advanced marine vehicles over the last few decades and many of these developments have been presented at the International High Performance Marine Vehicles Conference held annually since 1997 in Shanghai China This comprehensive first volume covers high speed monohulls multihulls hydrofoil craft air cavity craft and wing in ground effect craft The papers cover a wide variety of hullforms including deep V hulls stepped hulls axe bow hullforms trimarans and pentamarans foil assisted catamarans and air lubrication craft All aspects of design including resistance powering seakeeping and maneuvering performance of these vessels are covered through theoretical experimental and numerical investigations **Power Prediction Modeling of Conventional High-Speed Craft** Dejan Radojčić, Milan Kalajdžić, Aleksandar Simić, 2019-10-29 The proposed book addresses various power prediction methods a principal design objective for high speed craft of displacement semi displacement and planing type At the core of the power prediction methods are mathematical models based on experimental data derived from various high speed hull and propeller series Regression analysis and Artificial Neural Network ANN methods are used as extraction tools for this kind of models The most

significant factors for in service power prediction are bare hull resistance dynamic trim and the propeller's open water efficiency Therefore mathematical modeling of these factors is a specific focus of the book Furthermore the book includes a summary of most of the power prediction relevant literature published in the last 50 years and as such is intended as a reference overview of the best high speed craft modeling practices Once these mathematical models have been developed and validated they can be readily programmed into software tools thereby enabling the parametric analyses required for the optimization of a high speed craft design The proposed book is intended primarily for naval architects who design and develop various types of high speed vessels yachts boats etc as well as for students who are interested in the design of fast vessels The book includes useful Excel Macro Codes for the outlined mathematical models Moreover software for all considered models is provided

Ship Resistance and Propulsion Anthony F. Molland, Stephen R. Turnock, Dominic A. Hudson, 2017-08-17 This updated edition provides a modern scientific approach to evaluating ship resistance and propulsion for a range of ship types

Hydrodynamics of High-Speed Marine Vehicles Odd M. Faltinsen, 2006-01-09 Hydrodynamics of High Speed Marine Vehicles first published in 2006 discusses the three main categories of high speed marine vehicles vessels supported by submerged hulls air cushions or foils The wave environment resistance propulsion seakeeping sea loads and manoeuvring are extensively covered based on rational and simplified methods Links to automatic control and structural mechanics are emphasized A detailed description of waterjet propulsion is given and the effect of water depth on wash resistance sinkage and trim is discussed Chapter topics include resistance and wash slamming air cushion supported vessels including a detailed discussion of wave excited resonant oscillations in air cushion and hydrofoil vessels The book contains numerous illustrations examples and exercises

Encyclopedia of Ocean Engineering Weicheng Cui, Shixiao Fu, Zhiqiang Hu, 2022-06-29 This encyclopedia adopts a wider definition for the concept of ocean engineering Specifically it includes 1 offshore engineering fixed and floating offshore oil and gas platforms pipelines and risers cables and moorings buoy technology foundation engineering ocean mining marine and offshore renewable energy aquaculture engineering and subsea engineering 2 naval architecture ship and special marine vehicle design intact and damaged stability technology for energy efficiency and green shipping ship production technology decommissioning and recycling 3 polar and Arctic Engineering ice mechanics ice structure interaction polar operations polar design environmental protection 4 underwater technologies AUV ROV design AUV ROV hydrodynamics maneuvering and control and underwater specific communicating and sensing systems for AUV ROVs It summarizes the A Z of the background and application knowledge of ocean engineering for use by ocean scientists and ocean engineers as well as nonspecialists such as engineers and scientists from all disciplines economists students and politicians Ocean engineering theories ocean devices and equipment ocean design and operation technologies are described by international experts many from industry and each entry offers an introduction and references for further study making current technology and operating practices available for

future generations to learn from The book also furthers our understanding of the current state of the art leading to new and more efficient technologies with breakthroughs from new theory and materials As the land resources approach the exploitation limit ocean resources are becoming the next choice for the sustainable development As such ocean engineering is vital in the 21st century **HSMV 2020** E. Begovic,2020-11-03 This book presents the proceedings of the 12th International Symposium on High Speed Marine Vehicles held virtually as an e conference for the first time on 15 and 16 October 2020 High Speed Marine Vehicles Conference has almost 30 year history since the first Conference held in Naples in 1991 Since then it has been an opportunity to present and discuss developments in the design construction and operation of High Speed Marine Vessels More than 40 abstracts were submitted for this edition of the conference and following a rigorous review process 26 papers were selected for inclusion in this book These have been divided into 7 sections CFD EFD sea trials hydrofoils multi hull hydrodynamics planing hull hydrodynamics propulsion and ship machinery second generation intact stability criteria and structures loads strength and materials Topics covered include updated aspects of and developments in ship design numerical and experimental hydrodynamics seakeeping and maneuvering and marine structures and machinery This publication will be of interest to researchers from academia industry government agencies and certifying authorities as well as designers and operators of high speed vessels *High Performance Marine Vessels* Liang Yun,Alan Bliault,2014-07-08 High Performance Marine Vessels HPMVs range from the Fast Ferries to the latest high speed Navy Craft including competition power boats and hydroplanes hydrofoils hovercraft catamarans and other multi hull craft High Performance Marine Vessels covers the main concepts of HPMVs and discusses historical background design features services that have been successful and not so successful and some sample data of the range of HPMVs to date Included is a comparison of all HPMVs craft and the differences between them and descriptions of performance hydrodynamics and aerodynamics Readers will find a comprehensive overview of the design development and building of HPMVs

Mathematical Modeling of Inland Vessel Maneuverability Considering Rudder Hydrodynamics Jialun Liu,2020-05-11 This book demonstrates that different rudder configurations have different hydrodynamic characteristics which are influenced by the profile the parameters and the specific configuration The author proposes new regression formulas to help naval architects quickly estimate the rudder induced forces and moments in maneuvering Furthermore the author proposes and validates an integrated maneuvering model for both seagoing ships and inland vessels Using the proposed regression formulas and maneuvering model the specific impacts of rudder configurations on inland vessel maneuverability are studied In turn the book demonstrates the application of Reynolds Averaged Navier Stokes RANS simulations to obtain rudder hydrodynamic characteristics and the integration of the RANS results into maneuvering models as an accurate estimation of rudder forces and moments needed to quantify the impacts of rudder configurations on ships maneuvering performance In addition the author proposes new criteria for the prediction and evaluation of inland vessel

maneuverability Simulations of ships with various rudder configurations are presented in order to analyze the impacts of rudder configurations on ship maneuverability in different classic and proposed test maneuvers Offering essential guidance on the effects of rudders for inland vessel maneuverability and helping practical engineers make informed design choices the book is of interest to researchers and academics in the field of naval engineering as well as students of naval architecture Industrial practitioners working on ship design may also find it beneficial

High-performance Ships Stanley W. Doroff,1960

Hydrodynamics VI: Theory and Applications Liang Cheng,2004-10-15 The International Conference on Hydrodynamics is an increasingly important event at which academics researchers and practitioners can exchange new ideas and their research findings This volume contains papers from the 2004 conference covering a wide range of subjects within hydrodynamics including traditional engineering architectural and mecha

Twenty-Third Symposium on Naval Hydrodynamics National Research Council,Division on Engineering and Physical Sciences,Naval Studies Board,Bassin d'Essais des Carènes,Office of Naval Research,2002-01-01 Vive la Revolution was the theme of the Twenty Third Symposium on Naval Hydrodynamics held in Val de Reuil France from September 17 22 2000 as more than 140 experts in ship design construction and operation came together to exchange naval research developments The forum encouraged both formal and informal discussion of presented papers and the occasion provides an opportunity for direct communication between international peers This book includes sixty three papers presented at the symposium which was organized jointly by the Office of Naval Research the National Research Council Naval Studies Board and the Bassin d Essais des Car nes This book includes the ten topical areas discussed at the symposium wave induced motions and loads hydrodynamics in ship design propulsor hydrodynamics and hydroacoustics CFD validation viscous ship hydrodynamics cavitation and bubbly flow wave hydrodynamics wake dynamics shallow water hydrodynamics and fluid dynamics in the naval context

[The Maritime Engineering Reference Book](#) Anthony F. Molland,2011-10-13 The Maritime Engineering Reference Book is a one stop source for engineers involved in marine engineering and naval architecture In this essential reference Anthony F Molland has brought together the work of a number of the world s leading writers in the field to create an inclusive volume for a wide audience of marine engineers naval architects and those involved in marine operations insurance and other related fields Coverage ranges from the basics to more advanced topics in ship design construction and operation All the key areas are covered including ship flotation and stability ship structures propulsion seakeeping and maneuvering The marine environment and maritime safety are explored as well as new technologies such as computer aided ship design and remotely operated vehicles ROVs Facts figures and data from world leading experts makes this an invaluable ready reference for those involved in the field of maritime engineering Professor A F Molland BSc MSc PhD CEng FRINA is Emeritus Professor of Ship Design at the University of Southampton UK He has lectured ship design and operation for many years He has carried out extensive research and published widely on ship design and various aspects of ship hydrodynamics A comprehensive

overview from best selling authors including Bryan Barrass Rawson and Tupper and David Eyres Covers basic and advanced material on marine engineering and Naval Architecture topics Have key facts figures and data to hand in one complete reference book

Fundamentals of Ship Hydrodynamics Lothar Birk, 2019-04-25 Fundamentals of Ship Hydrodynamics Fluid Mechanics Ship Resistance and Propulsion Lothar Birk University of New Orleans USA Bridging the information gap between fluid mechanics and ship hydrodynamics Fundamentals of Ship Hydrodynamics is designed as a textbook for undergraduate education in ship resistance and propulsion The book provides connections between basic training in calculus and fluid mechanics and the application of hydrodynamics in daily ship design practice Based on a foundation in fluid mechanics the origin use and limitations of experimental and computational procedures for resistance and propulsion estimates are explained The book is subdivided into sixty chapters providing background material for individual lectures The unabridged treatment of equations and the extensive use of figures and examples enable students to study details at their own pace Key features Covers the range from basic fluid mechanics to applied ship hydrodynamics Subdivided into 60 succinct chapters In depth coverage of material enables self study Around 250 figures and tables Fundamentals of Ship Hydrodynamics is essential reading for students and staff of naval architecture ocean engineering and applied physics The book is also useful for practicing naval architects and engineers who wish to brush up on the basics prepare for a licensing exam or expand their knowledge

Three-dimensional Planing Hydrodynamics Based on a Vortex Lattice Method Canhai Lai, 1994

Annual Report of the Secretary of Defense and the Annual Reports of the Secretary of the Army, Secretary of the Navy, Secretary of the Air Force United States Department of Defense, 1961

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Performance By Design Hydrodynamics For High Speed Vessels Introduction

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