

Acces PDF HANDBOOK OF MARINE CRAFT HYDRODYNAMICS AND MOTION CONTROL

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KYKNW9 - AIDAN HERRERA

* Each chapter is written by one or more invited world-renowned experts * Information provided in handy reference tables and design charts * Numerous examples demonstrate how the theory outlined in the book is applied in the design of structures Tremendous strides have been made in the last decades in the advancement of offshore exploration and production of minerals. This book fills the need for a practical reference work for the state-of-the-art in offshore engineering. All the basic background material and its application in offshore engineering is covered. Particular emphasis is placed in the application of the theory to practical problems. It includes the practical aspects of the offshore structures with handy design guides, simple description of the various components of the offshore engineering and their functions. The primary purpose of the book is to provide the important practical aspects of offshore engineering without going into the nitty-gritty of the actual detailed design. · Provides all the important practical aspects of ocean engineering without going into the 'nitty-gritty' of actual design details· · Simple to use - with handy design guides, references tables and charts· · Numerous examples demonstrate how theory is applied in the design of structures

This book deals with the state of the art in underwater robotics experiments of dynamic control of an underwater vehicle. The author presents experimental results on motion control and fault tolerance to thrusters' faults with the autonomous vehicle ODIN. This second substantially improved and expanded edition new features are presented dealing with fault-tolerant control and coordinated control of autonomous underwater vehicles.

This book focuses on autonomous marine vessel systems and control approaches. In particular, it mainly contains modeling, analysis and control design methodologies for covert stabilization control, trajectory tracking control, and cooperative formation control of AMVs. The comprehensive and systematic treatment of practical issues in autonomous marine vessel systems is one of the book's significant features, particularly suited for readers interested in learning control problems in AMV and other related topic areas like mobile robots and vehicles. The book can benefit researchers, engineers, and graduate students in mathematical skills, methodologies, and algorithms needed in the analysis and control design for tracking and stabilization, cooperative control of surface vessels and underwater vehicles. Through the book, readers can have a deeper understanding of such fields.

Hope Is a Bright Star is the story of a mother's journey from shock and fear at her young daughter's cancer diagnosis to anguish and despair at her death just a year later—and, finally, to peace and acceptance of her new life. When thirteen-year-old Elizabeth is diagnosed with a rare bone cancer, Faith is in awe of her courageous child, who faces her plight straight on and inspires all who meet her. Despite an army of medical professionals who pro-

vide innovative care for Elizabeth, she dies, and Faith and her surviving daughter, Olivia, are thrown into a maelstrom of grief. They find unexpected comfort in the arms of their family, friends, and community—but Faith faces another shock when she has her own cancer diagnosis while navigating the uncharted waters of a life she never expected. In time, Faith discovers moments and places of comfort and peace, and she slowly changes from a mother in despair to a woman with hope for the future. At turns heartbreaking and heartwarming, *Hope Is a Bright Star* reveals how abiding love can heal a family.

This very complete book includes more than 270 illustrations, charts, and tables on the subject of creating hydrofoil boats. Because hydrofoils fly like airplanes, except in a denser fluid, the book's subject could be described as aerodynamics adapted to hydrofoils.

Knowledge of added body masses that interact with fluid is necessary in various research and applied tasks of hydro- and aeromechanics: steady and unsteady motion of rigid bodies, total vibration of bodies in fluid, local vibration of the external plating of different structures. This reference book contains data on added masses of ships and various ship and marine engineering structures. Also theoretical and experimental methods for determining added masses of these objects are described. A major part of the material is presented in the format of final formulas and plots which are ready for practical use. The book summarises all key material that was published in both Russian and English-language literature. This volume is intended for technical specialists of shipbuilding and related industries. The author is one of the leading Russian experts in the area of ship hydrodynamics.

The Encyclopedia of Systems and Control collects a broad range of short expository articles that describe the current state of the art in the central topics of control and systems engineering as well as in many of the related fields in which control is an enabling technology. The editors have assembled the most comprehensive reference possible, and this has been greatly facilitated by the publisher's commitment continuously to publish updates to the articles as they become available in the future. Although control engineering is now a mature discipline, it remains an area in which there is a great deal of research activity, and as new developments in both theory and applications become available, they will be included in the online version of the encyclopedia. A carefully chosen team of leading authorities in the field has written the well over 250 articles that comprise the work. The topics range from basic principles of feedback in servomechanisms to advanced topics such as the control of Boolean networks and evolutionary game theory. Because the content has been selected to reflect both foundational importance as well as subjects that are of current interest to the research and practitioner communities, a broad readership that includes students, application engineers,

and research scientists will find material that is of interest.

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.

This book presents a theoretical treatment, as well as a summary of practical methods of computation, of the forces and moments that act on marine craft. Its aim is to provide the tools necessary for the prediction or simulation of craft motions in calm water and in waves. In addition to developing the required equations, the author gives relations that permit at least approximate evaluation of the coefficients so that useful results can be obtained. The approach begins with the equations of motion for rigid bodies, relative to fixed- and moving-coordinate systems; then, the hydrodynamic forces are examined, starting with hydrostatics and progressing to the forces on a moving vehicle in calm water and (after a review of water-wave theory) in waves. Several detailed examples are presented, including calculations of hydrostatics, horizontal- and vertical-plane directional stability, and wave-induced motions. Also included are unique discussions on various effects, such as fin-hull interactions, numerical stability of integrators, heavy torpedoes, and the dynamics of high-speed craft. The book is intended to be an introductory-level graduate text and a reference for the practicing professional.

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

Handbook of MARINE CRAFT HYDRODYNAMICS AND MOTION CONTROL The latest tools for analysis and design of advanced GNC systems Handbook of Marine Craft Hydrodynamics and Motion Control is an extensive study of the latest research in hydrodynamics, guidance, navigation, and control systems for marine craft. The text establishes how the implementation of mathematical models and modern control theory can be used for simulation and verification of control systems, decision-support systems, and situational awareness systems. Coverage includes hydrodynamic models for marine craft, models for wind, waves and ocean currents, dynamics and stability of marine craft, advanced guidance principles, sensor fusion, and inertial navigation. This important book includes the latest tools for analysis and design of advanced GNC systems and presents new material on unmanned underwater vehicles, surface craft, and autonomous vehicles. References and examples are included to enable engineers to analyze existing projects before making their own designs, as well as MATLAB scripts for hands-on software development and testing. Highlights of this Second Edition include: Topical case studies and worked examples demonstrating how you can apply modeling and control design techniques to your own designs A Github repository with MATLAB scripts (MSS toolbox) compatible with the latest software releases from Mathworks New content on mathematical modeling, including models for ships and underwater vehicles, hydrostatics, and control forces and moments New methods for guidance and navigation, including line-of-sight (LOS) guidance laws for path following, sensory systems, model-based navigation systems, and inertial navigation systems This fully revised Second Edition includes innovative research in hydrodynamics and GNC systems for marine craft, from ships to autonomous vehicles operating on the surface and under water. Handbook of Marine Craft Hydrodynamics and Motion Control is a must-have for students and engineers working with unmanned systems, field robots, autonomous vehicles, and ships. MSS toolbox: <https://github.com/cybergalactic/mss> Lecture notes: <https://www.fossen.biz/wiley> Author's home page: <https://www.fossen.biz>

Underwater vehicles present some difficult and very particular control system design problems. These are often the result of nonlinear dynamics and uncertain models, as well as the presence of sometimes unforeseeable environmental disturbances that are difficult to measure or estimate. Autonomous Underwater Vehicles: Modeling, Control Design, and Simulation outlines a novel approach to help readers develop models to simulate feedback controllers for motion planning and design. The book combines useful information on both kinematic and dynamic nonlinear feedback control models, providing simulation results and other essential information, giving readers a truly unique and all-encompassing new perspective on design. Includes MATLAB® Simulations to Illustrate Concepts and Enhance Understanding Starting with an introductory overview, the book offers examples of underwater vehicle construction, exploring kinematic fundamentals, problem formulation, and controllability, among other key topics. Particularly valuable to researchers is the book's detailed coverage of

mathematical analysis as it applies to controllability, motion planning, feedback, modeling, and other concepts involved in nonlinear control design. Throughout, the authors reinforce the implicit goal in underwater vehicle design—to stabilize and make the vehicle follow a trajectory precisely. Fundamentally nonlinear in nature, the dynamics of AUVs present a difficult control system design problem which cannot be easily accommodated by traditional linear design methodologies. The results presented here can be extended to obtain advanced control strategies and design schemes not only for autonomous underwater vehicles but also for other similar problems in the area of nonlinear control.

Serving as an all-in-one guide to the entire field of coatings technology, this encyclopedic reference covers a diverse range of topics—including basic concepts, coating types, materials, processes, testing and applications—summarizing both the latest developments and standard coatings methods. Take advantage of the insights and experience of over

The early development of the screw propeller. Propeller geometry. The propeller environment. The ship wake field, propeller performance characteristics.

A textbook that offers a unified treatment of the applications of hydrodynamics to marine problems. The applications of hydrodynamics to naval architecture and marine engineering expanded dramatically in the 1960s and 1970s. This classic textbook, originally published in 1977, filled the need for a single volume on the applications of hydrodynamics to marine problems. The book is solidly based on fundamentals, but it also guides the student to an understanding of engineering applications through its consideration of realistic configurations. The book takes a balanced approach between theory and empirics, providing the necessary theoretical background for an intelligent evaluation and application of empirical procedures. It also serves as an introduction to more specialized research methods. It unifies the seemingly diverse problems of marine hydrodynamics by examining them not as separate problems but as related applications of the general field of hydrodynamics. The book evolved from a first-year graduate course in MIT's Department of Ocean Engineering. A knowledge of advanced calculus is assumed. Students will find a previous introductory course in fluid dynamics helpful, but the book presents the necessary fundamentals in a self-contained manner. The 40th anniversary of this pioneering book offers a foreword by John Grue. Contents Model Testing • The Motion of a Viscous Fluid • The Motion of an Ideal Fluid • Lifting Surfaces • Waves and Wave Effects • Hydrodynamics of Slender Bodies

Teacher digital resource package includes 2 CD-ROMs and 1 user guide. Includes Teacher curriculum guide, PowerPoint chapter presentations, an image gallery of photographs, illustrations, customizable presentations and student materials, Exam Assessment Suite, PuzzleView for creating word puzzles, and LessonView for dynamic lesson planning. Laboratory and activity disc includes the manual in both student and teacher editions and a lab materials list.

This book deals with ship design and in particular with methodologies of the preliminary design of ships. The book is complemented by a basic bibliography and five appendices with useful updated charts for the selection of the main dimensions and other basic characteristics of different types of ships (Appendix A), the determination of hull form from the data of systematic hull form series (Appendix B), the detailed description of the relational method for the preliminary estimation of ship weights (Appendix C), a brief review of the historical evolution of shipbuilding science and technology from the prehistoric era to date (Appendix D) and finally a historical review of regulatory developments of ship's damage stability to date (Appendix E). The book can be

used as textbook for ship design courses or as additional reading for university or college students of naval architecture courses and related disciplines; it may also serve as a reference book for naval architects, practicing engineers of related disciplines and ship officers, who like to enter the ship design field systematically or to use practical methodologies for the estimation of ship's main dimensions and of other ship main properties and elements of ship design.

Presented in a tutorial style, this comprehensive treatment unifies, simplifies, and explains most of the techniques for designing and analyzing adaptive control systems. Numerous examples clarify procedures and methods. 1995 edition.

Decreasing the magnetic field signature of a naval vessel will reduce its susceptibility to detonating naval influence mines and the probability of a submarine being detected by underwater barriers and maritime patrol aircraft. Both passive and active techniques for reducing the magnetic signatures produced by a vessel's ferromagnetism, roll-induced eddy currents, corrosion-related sources, and stray fields are presented. Mathematical models of simple hull shapes are used to predict the levels of signature reduction that might be achieved through the use of alternate construction materials. Also, the process of demagnetizing a steel-hulled ship is presented, along with the operation of shaft-grounding systems, paints, and alternate configurations for power distribution cables. In addition, active signature reduction technologies are described, such as degaussing and deamping, which attempt to cancel the fields surrounding a surface ship or submarine rather than eliminate its source. Table of Contents: Introduction / Passive Magnetic Silencing Techniques / Active Signature Compensation / Summary

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.

This second edition provides a comprehensive and scientific approach to evaluating ship resistance and propulsion. Written by experts in the field, it includes the latest developments in CFD, experimental techniques and guidance for the practical estimation of ship propulsive power. It addresses improvements in energy efficiency and reduced emissions, and the introduction of the Energy Efficiency Design Index (EEDI). Descriptions have now been included of pump jets, rim driven propulsors, shape adaptive foils, propeller noise and dynamic positioning. Trial procedures have been updated, and preliminary estimates of power for hydrofoil craft, submarines and AUVs are incorporated. Standard series

data for hull resistance and propeller performance are included, enabling practitioners to make ship power predictions based on material and data within the book. Numerous fully worked examples illustrate applications for most ship and small craft types, making this book ideal for practising engineers, naval architects, marine engineers and undergraduate and postgraduate students. Technical introduction to ship propeller hydrodynamics, for researchers in ocean technology, naval architecture, mechanical engineering.

The ever-growing demand for commercial activities at sea has meant that ships are rapidly developing and that the rules governing their construction and operation are changing. Practical Ship Design records these changes, their outcomes and the reasoning behind them. It deals with every aspect of ship design and handles a wide range of both merchant ships and naval ships with authority. It provides coverage of cargo ships and passenger ships, tugs, dredgers and other service craft. It also includes concept design, detail design, structural design, hydrodynamics design, the effect of regulations, the preparation of specifications and matters of costs and economics. Drawing on the author's extensive practical experience, Practical Ship Design is likely to interest everybody involved in the design, construction, repair and operation of ships. Students and the most experienced professionals will all benefit from the book's vast store of design data and its conclusions and recommendations.

This classic presentation has never been superseded in its encyclopedic coverage of the subject, and its excellent exposition of fundamental theorems, equations, and detailed methods of solution. Topics include many aspects of the dynamics of liquids and gases and 3-dimensional problems on motion of solids through a liquid. 1932 edition.

The Definitive Reference for Designers and Design Students A solid grasp of the fundamentals of materials, along with a thorough understanding of load and design techniques, provides the components needed to complete a marine platform design. Design Principles of Ships and Marine Structures details every facet of ship design and design integration, and highlights the design aspects that must be put together to create an integrated whole product. This book discusses naval architecture and marine engineering applications and principles relevant to the design of various systems, examines advanced numerical techniques that can be applied to maritime design procedure at the concept design stage, and offers a comprehensive approach to the subject of ship design. Covers the Entire Sphere of Marine Design The book begins with an introduction to marine design and the marine environment, describing many of the marine products that are used for transportation, defense and the exploitation of marine resources. It also discusses stability issues relevant to ship design, as well as hydrodynamic aspects of resistance, propulsion, sea keeping and maneuvering, and their effects on design. In addition to covering the various systems and sub-systems that go into making a complex product to be used in maritime environment, the author explains engineering economics and its application in ship design, and provides examples wherever necessary. Written by an author with more than 35 years of teaching experience, this book: Describes various design methodologies such as sequential design process with the application of concurrent engineering and set based design factors in the use of computer-aided design techniques Highlights the shape design methodology of ship forms and layout design principles Considers design aspects relative to safety and risk assessment Introduces the design for production aspects in marine product development Discusses design principles for sustainability Explains the principles of numerical optimization for decision-making Design Principles of Ships

and Marine Structures focuses on ship design efficiency, safety, sustainability, production, and management, and appeals to students and design professionals in the field of shipping, shipbuilding and offshore engineering.

Over the past twenty years there has been considerable improvement and new information in the design of port and berth structures. This handbook reflects the latest progress and developments in navigation safety, port planning and site selection, layout of container, oil and gas terminals, cargo handling, berth design and construction, fender and mooring principles. It presents guidelines and recommendations for the main items and assumptions in the layout, design and construction of modern port structures, and the forces and loadings acting on them. The book provides an evaluation of different designs and construction methods for port and berth structures, and recommendations given by the different international harbour standards and recommendations. Practising harbour and port engineers and students will find the handbook an invaluable source of information.

This textbook offers a comprehensive introduction to the control of marine vehicles, from fundamental to advanced concepts, including robust control techniques for handling model uncertainty, environmental disturbances, and actuator limitations. Starting with an introductory chapter that extensively reviews automatic control and dynamic modeling techniques for ocean vehicles, the first part of the book presents in-depth information on the analysis and control of linear time invariant systems. The concepts discussed are developed progressively, providing a basis for understanding more complex techniques and stimulating readers' intuition. In addition, selected examples illustrating the main concepts, the corresponding MATLAB® code, and problems are included in each chapter. In turn, the second part of the book offers comprehensive coverage on the stability and control of nonlinear systems. Following the same intuitive approach, it guides readers from the fundamentals to more advanced techniques, which culminate in integrator backstepping, adaptive and sliding mode control. Leveraging the author's considerable teaching and research experience, the book offers a good balance of theory and stimulating questions. Not only does it provide a valuable resource for undergraduate and graduate students; it will also benefit practitioners who want to review the foundational concepts underpinning some of the latest advanced marine vehicle control techniques, for use in their own applications.

This handbook is the definitive reference for the interdisciplinary field that is ocean engineering. It integrates the coverage of fundamental and applied material and encompasses a diverse spectrum of systems, concepts and operations in the maritime environment, as well as providing a comprehensive update on contemporary, leading-edge ocean technologies. Coverage includes an overview on the fundamentals of ocean science, ocean signals and instrumentation, coastal structures, developments in ocean energy technologies and ocean vehicles and automation. It aims at practitioners in a range of offshore industries and naval establishments as well as academic researchers and graduate students in ocean, coastal, offshore and marine engineering and naval architecture. The Springer Handbook of Ocean Engineering is organized in five parts: Part A: Fundamentals, Part B: Autonomous Ocean Vehicles, Subsystems and Control, Part C: Coastal Design, Part D: Offshore Technologies, Part E: Energy Conversion

The Encyclopedia of Robotics addresses the existing need for an easily accessible yet authoritative and granular knowledge resource in robotic science and engineering. The encyclopedia is a work that comprehensively explains the scientific, application-based, interactive and socio-ethical parameters of robotics. It is the first work that explains at the concept and fact level the

state of the field of robotics and its future directions. The encyclopedia is a complement to Springer's highly successful Handbook of Robotics that has analyzed the state of robotics through the medium of descriptive essays. Organized in an A-Z format for quick and easy understanding of both the basic and advanced topics across a broad spectrum of areas in a self-contained form. The entries in this Encyclopedia will be a comprehensive description of terms used in robotics science and technology. Each term, when useful, is described concisely with online illustrations and enhanced user interactivity (on SpringerReference.com).

The technology of hydrodynamic modeling and marine craft motion control systems has progressed greatly in recent years. This timely survey includes the latest tools for analysis and design of advanced guidance, navigation and control systems and presents new material on underwater vehicles and surface vessels. Each section presents numerous case studies and applications, providing a practical understanding of how model-based motion control systems are designed. Key features include: a three-part structure covering Modeling of Marine Craft; Guidance, Navigation and Control Systems; and Appendices, providing all the supporting theory in a single resource kinematics, kinetics, hydrostatics, sea-keeping and maneuvering theory, and simulation models for marine craft and environmental forces guidance systems, sensor fusion and integrated navigation systems, inertial measurement units, Kalman filtering and nonlinear observer design for marine craft state-of-the-art methods for feedback control more advanced methods using nonlinear theory, enabling the user to compare linear design techniques before a final implementation is made. linear and nonlinear stability theory, and numerical methods companion website that hosts links to lecture notes and download information for the Marine Systems Simulator (MSS) which is an open source Matlab/Simulink® toolbox for marine systems. The MSS toolbox includes hydrodynamic models and motion control systems for ships, underwater vehicles and floating structures With an appropriate balance between mathematical theory and practical applications, academic and industrial researchers working in marine and control engineering aspects of manned and unmanned maritime vehicles will benefit from this comprehensive handbook. It is also suitable for final year undergraduates and postgraduates, lecturers, development officers, and practitioners in the areas of rigid-body modeling, hydrodynamics, simulation of marine craft, control and estimation theory, decision-support systems and sensor fusion. www.wiley.com/go/fossen_marine

A comprehensive and extensive study of the latest research in control systems for marine vehicles. Demonstrates how the implementation of mathematical models and modern control theory can reduce fuel consumption and improve reliability and performance. Coverage includes ocean vehicle modeling, environmental disturbances, the dynamics and stability of ships, sensor and navigation systems. Numerous examples and exercises facilitate understanding.

This edited volume includes thoroughly collected on sensing and control for autonomous vehicles. Guidance, navigation and motion control systems for autonomous vehicles are increasingly important in land-based, marine and aerial operations. Autonomous underwater vehicles may be used for pipeline inspection, light intervention work, underwater survey and collection of oceanographic/biological data. Autonomous unmanned aerial systems can be used in a large number of applications such as inspection, monitoring, data collection, surveillance, etc. At present, vehicles operate with limited autonomy and a minimum of intelligence. There is a growing interest for cooperative and coordinated multi-vehicle systems, real-time re-planning, robust autonomous navigation systems and robust autonomous control of vehicles. Un-

manned vehicles with high levels of autonomy may be used for safe and efficient collection of environmental data, for assimilation of climate and environmental models and to complement global satellite systems. The target audience primarily comprises research experts in the field of control theory, but the book may also be beneficial for graduate students.

This book focuses on the recent results of the research project funded by a Grant-in-Aid for Scientific Research (S) of the Japan Society for the Promotion of Science (No. 23226017) from FY 2011 to FY 2015 on an autonomous spilled oil and gas tracking buoy system and its applications to marine disaster prevention systems from a scientific point of view. This book spotlights research on marine disaster prevention systems related to incidents involving oil tankers and offshore platforms, approaching these problems from new scientific and technological perspectives. The most essential aspect of this book is the development of a deep-sea underwater robot for real-time monitoring of blowout behavior of oil and gas from the seabed and of a new type of autonomous surface vehicle for real-time tracking and monitoring of oil spill spread and drift on the sea surface using an oil sensor. The mission of these robots is to provide the simulation models for gas and oil blowouts or spilled oil drifting on the sea surface with measured data for more precision of predictions of oil and gas behavior.

Marine Rudders and Control Surfaces guides naval architects from the first principles of the physics of control surface operation, to the use of experimental and empirical data and applied computational fluid dynamic modelling of rudders and control surfaces. The empirical and theoretical methods applied to control surface design are described in depth and their use explained through application to particular cases. The design procedures are complemented with a number of worked practical examples of rudder and control surface design. • The only text dedicated to marine control surface design • Provides experimental, theoretical and applied design information valuable for practising engineers, designers and students • Accompanied by an online extensive experimental database together with software for theoretical predictions and design development

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.

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 hydrody-

dynamic 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 back-

ground for real-life modeling, this book is an ideal reference for practicing naval architects and graduate students.