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Coordinates; 2.3.3 ECEF Coordinates from Longitude and Latitude; 2.4 Transformations between BODY and FLOW; 2.4.1 Definitions of Course, Heading and Sideslip Angles; 2.4.2 Sideslip and Angle of Attack; 3 Rigid-Body Kinetics; 3.1 Newton-Euler Equations of Motion about CG; 3.1.1 Translational Motion about CG; 3.1.2 Rotational Motion about CG; 3.2 Newton-Euler Equations of Motion about CO; 3.2.1 Translational Motion about CO; 3.2.2 Rotational Motion about CO
3.3 Rigid-Body Equations of Motion3.3.1 Nonlinear 6 DOF Rigid-Body Equations of Motion; 3.3.2 Linearized 6 DOF Rigid-Body Equations of Motion; 4 Hydrostatics; 4.1 Restoring Forces for Underwater Vehicles; 4.1.1 Hydrostatics of Submerged Vehicles; 4.2 Restoring Forces for Surface Vessels; 4.2.1 Hydrostatics of Floating Vessels; 4.2.2 Linear (Small Angle) Theory for Boxed-Shaped Vessels; 4.2.3 Computation of Metacenter Height for Surface Vessels; 4.3 Load Conditions and Natural Periods; 4.3.1 Decoupled Computation of Natural Periods
4.3.2 Computation of Natural Periods in a 6 DOF Coupled System4.3.3 Natural Period as a Function of Load Condition; 4.4 Ballast Systems; 4.4.1 Conditions for Manual Pretrimming; 4.4.2 Automatic Pretrimming using Feedback from z, and ; 5 Seakeeping Theory; 5.1 Hydrodynamic Concepts and Potential Theory; 5.1.1 Numerical Approaches and Hydrodynamic Codes; 5.2 Seakeeping and Maneuvering Kinematics; 5.2.1 Seakeeping Reference Frame; 5.2.2 Transformation between BODY and SEAKEEPING; 5.3 The Classical Frequency-Domain Model; 5.3.1 Potential Coefficients and the Concept of Forced Oscillations
5.3.2 Frequency-Domain Seakeeping Models5.4 Time-Domain Models including Fluid Memory Effects; 5.4.1 Cummins Equation in SEAKEEPING Coordinates; 5.4.2 Linear Time-Domain Seakeeping Equations in BODY Coordinates; 5.4.3 Nonlinear Unified Seakeeping and Maneuvering Model with Fluid Memory Effects; 5.5 Case Study: Identification of Fluid Memory Effects; 5.5.1 Frequency-Domain Identification using the MSS FDI Toolbox; 6 Maneuvering Theory; 6.1 Rigid-Body Kinetics; 6.2 Potential Coefficients; 6.2.1 3 DOF Maneuvering Model; 6.2.2 6 DOF Coupled Motions
6.3 Nonlinear Coriolis Forces due to Added Mass in a Rotating Coordinate System

Sommario/riassunto

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