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CONTENT

Course Stability of a Ship Towing System

By Ahmad Fitriadhy & Hironori Yasukawa

Notes on Evaluation of Added Mass by the Finite Volume Method

By Jussi Martio

Adjoint-based Hull Design for Wake Optimisation

By Arthur Stück, Jörn Kröger & Thomas Rung

Interactive Hull Form Transformations using Curve Network Deformation

By Marcus Bole

C O N T E N T

VOL. 58 / NO. 1

4 Course Stability of a Ship Towing System

By Ahmad Fitriadhy & Hironori Yasukawa

This paper proposes a numerical model for course stability of a towed ship coupled to tow ship through towline using both nonlinear and linear approaches. Captive model tests were conducted at the towing tank to obtain hydrodynamic derivatives of both tow and towed ships. Effects of unstable towed ship and stable towed ship, towline, tow points and rudder autopilot parameters at tow ship were treated in the numerical analysis. The obtained simulation results are discussed and the influences of different configurations on course stability are pointed out.

24 Notes on Evaluation of Added Mass by the Finite Volume Method

By Jussi Martio

An unstructured finite-volume method (FVM) is applied to free-surface potential flow problems; added mass is calculated once the flow variables have been determined. The approach is applied to two test cases: flow over a circular cylinder and a generic geometry with a transom stern. Results are compared with an analytical solution and a finite-difference method.

34 Adjoint-based Hull Design for Wake Optimisation

By Arthur Stück, Jörn Kröger & Thomas Rung

The hull of a generic container vessel was redesigned with the aid of RANS-based adjoint sensitivity analysis in order to improve the quality of the wake field. The redesign was carried out manually at model scale using the sensitivity derivatives of two wake objective functions introduced into the adjoint method. Both flow and adjoint solvers are based on an unstructured finite volume discretisation of incompressible flow equations. The distribution of the sensitivity derivatives with respect to design parameters yields valuable insight into the design problem from the objective point of view. The method can identify key influences and lead to an improved wake field after two design cycles.

46 Interactive Hull Form Transformations using Curve Network Deformation

By Marcus Bole

This paper presents an approach to hull surface transformation based on identifying features in the form topology. The technique allows changes using both interactive mouse manipulation and numerical parameters. A rich transformation tool kit is created which allows the user to confidently make rapid hull changes in conjunction with existing surface definition techniques.

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