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70 Capturing Secondary Cavitation – A Step Towards Numerical Assessment of Cavitation Nuisance

By Rickard E. Bensow

Numerical simulations using incompressible Large-Eddy Simulation together with a mixture assumption and a finite-rate mass transfer model demonstrate the presence of several cavitation mechanisms important for cavitation nuisance of hydrodynamic machinery such as marine propellers and power turbines. One of such mechanisms is brought about by re-entrant jets, which can cut sheet cavities and thus lead to shedding and travelling cavities which in turn may cause nuisance as they collapse. However, severe erosion and noise generation also stem from the formation and development of small scale structures called secondary cavitation, formed e.g. in shear layers through vortex roll-up, which are also important for cavitation nuisance risk. The extent of the resolution of the secondary cavitation in the computational setting is discussed. Cavitation on a NACA0015 foil at 6° angle of attack and $\sigma = 1.0$ in a three-dimensional domain is studied.

82 Wind Loads on a Passenger/Car Ferry by CFD Computations and Wind Tunnel Tests

By Werner Blendermann, Katrin Hellwig & Eberhard Schuckert

Results are reported of a combined numerical and experimental investigation of the wind loads on a scale model of a passenger/car ferry, as well as a full-scale computation. The ship model was tested in a wind tunnel with a clearance above a board modelling the sea surface; the computations were performed both with and without the clearance. Such details as life boats and masts were omitted in the numerical model to simplify the grid generation. The model tests were carried out both with and without such details.

90 A procedure to Assess the Damage of a Grounded Ship: A Full-Scale Validation Case Study
By Sören Ehlers

This paper concerns the analysis and simulation of a grounding accident from a structural point of view. A procedure is presented to assess the damage of a grounded ship. A non-linear finite-element method is used to simulate the bottom damage until a certain penetration or fracture limit is reached. An appropriate non-linear strain and stress measure describes the material behaviour including fracture. The procedure is validated against a case study of a grounded Suezmax tanker.

100 A New Parameterisation Approach for Mixed-Integer Optimisation
By Daniele Peri & Matteo Diez

A strategy for solving optimisation problems with an unknown number of design variables is presented. The number of the design variables and their values are defined implicitly by adopting a special rearrangement of the data structure which does not require direct definition of the number of design variables and their values. The optimal number of design variables is found together with the solution of the optimisation problem.

112 Turning Ability of a Ship Towing System
By Ahmad Fitriadhy & Hironori Yasukawa

This paper presents an application of linear and nonlinear analyses to the turning ability of a towing system consisting of a tug and a barge. The influence of several parameters is examined on the turning performance of the towing system. Longer towline, larger tug and tow point nearer to the bow of the barge increase the turning diameter. Tow point on the tug closer to its centre of gravity decreases the turning diameter significantly.

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in cooperation with Science Support Centre, University Duisburg-Essen
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D – 47057 Duisburg
Phone +49 (0)203 379-1173
E-Mail shiptechnology@uni-due.de

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