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Numerical study of ship motions and added resistance in regular incident waves of KVLCC2 model

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Abstract

In this study, the numerical investigation of ship motions and added resistance at constant forward velocity of KVLCC2 model is presented. Finite volume CFD code is used to calculate three dimensional, incompressible, unsteady RANS equations. Numerical computations show that reliable numerical results can be obtained in head waves. In the numerical analyses, body attached mesh method is used to simulate the ship motions. Free surface is simulated by using VOF method. The relationship between the turbulence viscosity and the velocities are obtained through the standard k – ε turbulence model. The numerical results are examined in terms of ship resistance, ship motions and added resistance. The validation studies are carried out by comparing the present results obtained for the KVLCC2 hull from the literature. It is shown that, ship resistance, pitch and heave motions in regular head waves can be estimated accurately, although, added resistance can be predicted with some error.

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Keywords

Ship motions; RANSE; Turbulent free surface flows; Added wave resistance

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