Development of A Seakeeping Solver

Type of project: MSc or BSc

Project description:

Ocean wave forces on ships and other offshore structures have for many years been computed using *potential flow* theory using a numerical approach called the *boundary element method.* Reliable results can be achieved with relatively low computational effort in comparison with methods based on solving the Navier-Stokes equations (*CFD)*. At the Department of Mechanical Engineering, a potential-flow solver has been developed which uses the *finite difference* numerical method on overset grids. This solver can be employed to calculate the response of the ship in ocean waves (*seakeeping*).

Interested students are invited to get involved in the further development of this seakeeping solver. Possible project topics include: *improved grid generation around ship hulls*, *validation of added resistance calculations against measurements, implementation of new models for added resistance,* and *optimisation and parallelization of the solver.*

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$$F_n = \frac{U}{\sqrt{gL}} = 0.3$$