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Determining wave resistance of a ship using a dissipative potential flow model[1] MIRJAM FÜRTH, MINGYI TAN, ZHI-MIN CHEN, University of Southampton, Fluid Structure Interactions Research Group — Potential flow modelling is a common method to predict the wave resistance of ships. In its conventional form the flow is assumed to be free from damping due to the inviscid assumption of potential flow. However, it is evident by just looking at waves that they decay with time and distance. It is a reasonable assumption that, by including more of the actual physical aspect in mathematical model, the quality of the prediction will improve. As Havelock wrote almost 80 years ago "It seems fairly certain that one of the main causes of differences between theoretical and experimental result is the neglect of fluid friction in the calculation of ship waves." In this study, the problem is modelled using Kelvin sources with a translating speed. Rayleigh damping is introduced in the model to emulate viscous damping. To calculate the source influences, a dissipative 3D Green function is derived. For initial validation of the Green function, thin ship theory is used to determine the wave pattern behind a Wigley hull and a modified form of the Eggers et al. transverse cut technique is used to calculate the wave resistance. To evaluate the method for fuller and more realistic hull shapes a panel method which calculates the resistance via the pressure on the ship hull is used.

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Mirjam Fürth
University of Southampton, Fluid Structure Interactions Research Group

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