Nominal vs. effective wake fields and their influence on propeller cavitation performance - DTU Orbit (09/08/2019)

Nominal vs. effective wake fields and their influence on propeller cavitation performance

Propeller designers often need to base their design on the nominal model scale wake distribution because the effective full scale distribution is not available. The effects of such incomplete design data on cavitation performance are examined in this paper. The behind-ship cavitation performance of two propellers is evaluated, where the cases considered include propellers operating in the nominal model and full scale wake distributions and in the effective wake distribution, also in the model and full scale. The method for the analyses is a combination of RANS for the ship hull and a panel method for the propeller flow, with a coupling of the two for the interaction of ship and propeller flows. The effect on sheet cavitation due to the different wake distributions is examined for a typical full-form ship. Results show considerable differences in cavitation extent, volume, and hull pressure pulses.

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