

Prediction of ship turning maneuvers in constant wind and regular waves

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Abstrak

A ship usually performs maneuvers under the influence of external forces and moments, such as wind, waves, and current. Therefore, it is important to understand the maneuvering behavior of ships under the action of external forces. This paper discusses the turning maneuvers of an Indonesian ro-ro ferry under the combined influence of constant wind and regular waves using the mathematical modelling group (MMG). The ship's position relative to the wave trough is added to the original MMG model to estimate the exciting forces and moment induced by the waves. The results of a numerical simulation show that the effect of wave height on turning ability is more significant for a small wavelength; this effect decreases as the wavelength increases. The effect of wavelength on the sway force and yaw moment is more significant compared with its effect on the surge force. The ship's initial position relative to the wave trough does not have a significant effect on the turning characteristic and it can be neglected for the present study's subject ship. Overall, the results of the present work compare well with published data.