

Abstract Submitted
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CFD Study of Extreme Ship Responses in Seaways by Designed Wave Trail KHANG PHAN, HAMID SADAT, University of North Texas — The assessment of extreme responses of ships in seaways is an important subject in the ship design. Linear prediction tools (e.g. the frequency domain and linear spectral analytical methods) are often used to predict the ship responses in waves. However, these tools are not reliable when it comes to severe operational conditions resulting in extreme motions. The need for nonlinear solver is imminent to enhance the accuracy of ship response predictions but computations are very time-consuming and practically impossible to search through all wave environments to assess the possible extreme responses. This study aims at designing a wave trail based on a few high-fidelity CFD simulations to predict extreme responses of ships in an optimal way. The studies focus on heave and pitch responses of semi-captive KCS (KRISO Container-Ship) advancing at $Fr=0.26$ in irregular head waves. Studies are also conducted in calm water and regular waves to validate the results against available experimental data. Simulations are achieved using our in-house CFD solver (CFDFoam) which has been built around OpenFOAM but is designed for ship hydrodynamic applications.

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