

Numerical Calculation of Dynamic Response of Catamaran Vessels Based on 3D Green Function Method

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Abstract : Seakeeping analysis of catamaran vessels in the earlier stages of design has become an important issue as it dictates the seakeeping characteristics, and it ensures safe navigation during the voyage. In the present paper, a 3D numerical method for the seakeeping prediction of catamaran vessel is presented using the 3D Green Function method. Both steady and unsteady potential flow problem is dealt with here. Using 3D linearized potential theory, the dynamic wave loads and the subsequent response of the vessel is computed. For validation of the numerical procedure catamaran vessel composed of twin, Wigley form demi-hull is used. The results of the present calculation are compared with the available experimental data and also with other calculations. The numerical procedure is also carried out for NPL-based round bilge catamaran, and hydrodynamic coefficients along with heave and pitch motion responses are presented for various Froude number. The results obtained by the present numerical method are found to be in fairly good agreement with the available data. This can be used as a design tool for predicting the seakeeping behavior of catamaran ships in waves.

Keywords : catamaran, hydrodynamic coefficients , motion response, 3D green function

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