Abstract Submitted
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Oscillation of Multiple-Bodies in a Free Surface.[1] PALANISWAMY ANANTHAKRISHNAN, JESSE CHAFIN, Florida Atlantic University — The present problem is of relevance in sea-keeping assessment of multi-hull ships (eg., catamaran or trimaran). Using boundary-integral and finite-difference algorithms, inviscid and viscous hydrodynamics of multiple bodies (hulls) under rigid-body oscillatory motions are studied. The findings of the research include: (i) The separation distance between the multi-hulls is a crucial parameter governing the hydrodynamic coefficients and, therefore, hull response in a given sea; (ii) At frequencies close to natural frequency of standing waves between the hulls, negative added mass and a large spike in wave damping due to outward radiating waves are observed; (iii) Trapped waves of various modes, including that on oscillating column of fluid between the hulls, are observed; (iv) Viscous effects on the hydrodynamic forces are significant at large Keulegan-Carpenter (KC) number and at natural frequencies of waves between the hulls with the significance being associated with vortices shed off the bilges of multi-hull ships due to body motion as well as set up of large-amplitude oscillating column of fluid between the hulls; and (v) In design, one can effectively adjust the dimensions of the main and side hulls to ensure small amplitude hull response to sea loads.

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