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Effect of Design Parameters on Porpoising Instability of a High Speed Planing Craft

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Abstract : It is important to estimate, predict, and avoid the dynamic instability of high speed planing crafts. It is known that design parameters like relative location of center of gravity with respect to the dynamic lift centre and length to beam ratio of the craft have influence on the tendency to porpoise. This paper analyzes the hydrodynamic performance on the basis of the semi-empirical Savitsky method and also estimates the same by numerical simulations based on Reynolds Averaged Navier Stokes (RANS) equations using a commercial code namely, STAR- CCM+. The paper examines through the same numerical simulation considering dynamic equilibrium, the changing running trim, which results in porpoising. Some interesting results emerge from the study and this leads to early detection of the instability.

Keywords : CFD, planing hull, porpoising, Savitsky method
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