

A Study on Verification of the Dynamic Modeling for a Submerged Body Based on Numerical Simulation

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Abstract

This study proposed a procedure to identify maneuvering coefficients that brought about abnormal motions in the simulation of a submerged body. The first step in responding to abnormal motions was conducting stability analysis to determine whether the submerged body could be simulated. If doing so was feasible, sensitivity analysis was then performed to determine maneuvering coefficients that caused the abnormal motion in the simulation. Finally, we analyzed the order of maneuvering coefficients identified by the sensitivity analysis. We also compared it with empirical formulas and other results obtained from model tests. The dynamics model targeting a high-speed submerged body was indirectly verified by the above procedure. In this study, the effectiveness of the dynamic model was verified, and parameters causing the abnormal motion were identified in accordance with the developed procedure.

Keywords: 5-DOF equations of motion, maneuvering simulation, maneuvering coefficients, stability analysis, sensitivity analysis, abnormal motion

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