عنوان مقاله:

CFD Modeling of Wing and Body of an AUV for Estimation of Hydrodynamic Coefficients

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خلاصه مقاله:

Coefficients or hydrodynamic derivatives of autonomous underwater vehicles (AUVs) play a key role in their design and maneuverability. Using a suitable method to estimate these coefficients serves as a time efficient approach to raise the achievable precision in the design and control of AUVs. This paper estimates hydrodynamic derivatives of an AUV using computational fluid dynamics (CFD) for the wings and body. CFD modeling was performed to simulate captive model tests including straight line and planar motion mechanism (PMM). In such runs, the process was implemented separately for the wing and body. Experimental tests for the same AUV in the water tunnel were carried out for CFD validation. Comparing the numerical results to the experimental data, it was shown that the modeling method is able to estimate these coefficients at reasonable accuracy. The proposed modeling method was proved to be efficient in estimating hydrodynamic derivatives and hence can reduce associated computational costs with the process of detail design of AUVs.

کلمات کلیدی:

Hydrodynamics derivatives, Captive model test, Numerical modeling, AUV, Water tunnel