

A CFD-Based Study on the Hydrodynamic Characteristics of an Amphibious Dredging Robot (Postprint)

Authors: Rui Hongbin

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Abstract

For an amphibious dredging robot, its hydrostatic condition and navigation resistance are analyzed based on computational fluid dynamics (CFD). The overset grid method is employed to calculate the draft and trim angle under hydrostatic condition; the static grid method and overset grid method are respectively adopted to predict the navigation resistance of the amphibious dredging robot under straight-line calm water navigation conditions, and a comparison between these two methods is conducted. The research results demonstrate that: the overset grid method can effectively calculate the draft and trim angle of the amphibious dredging robot under hydrostatic condition; both the static grid method and overset grid method can effectively predict the water navigation resistance of the amphibious dredging robot, the static grid method exhibits high computational efficiency but is only applicable to low-speed operating conditions, whereas the overset grid method is suitable for navigation resistance prediction at various sailing speeds but has lower computational efficiency. The research findings possess significant reference value for the design and improvement of amphibious dredging robots.

Full Text

Preamble

MATH_{0001} MATH_{0002}

Section G

Section D

Additional Mathematical Content

MATH_{0003}

References

Note: Figure translations are in progress. See original paper for figures.

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