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RANS Simulation of Viscous Flow around Hull of Multipurpose Amphibious Vehicle

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Abstract : The practical application of the Computational Fluid Dynamics (CFD), for predicting the flow pattern around Multipurpose Amphibious Vehicle (MAV) hull has made much progress over the last decade. Today, several of the CFD tools play an important role in the land and water going vehicle hull form design. CFD has been used for analysis of MAV hull resistance, sea-keeping, maneuvering and investigating its variation when changing the hull form due to varying its parameters, which represents a very important task in the principal and final design stages. Resistance analysis based on CFD (Computational Fluid Dynamics) simulation has become a decisive factor in the development of new, economically efficient and environmentally friendly hull forms. Three-dimensional finite volume method (FVM) based on Reynolds Averaged Navier-Stokes equations (RANS) has been used to simulate incompressible flow around three types of MAV hull bow models in steady-state condition. Finally, the flow structure and streamlines, friction and pressure resistance and velocity contours of each type of hull bow will be compared and discussed.

Keywords : RANS simulation, multipurpose amphibious vehicle, viscous flow structure, mechatronic
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