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خلاصه مقاله:

In the present study, a three-dimensional numerical squid model was generated from a computed tomography images of a longfin inshore squid to investigate fluid flow characteristics around the squid. The three-dimensional squid model obtained from a ۳D-printer was utilized in digital particle image velocimetry (DPIV) measurements to acquire velocity contours in the region of interest. Once the three-dimensional numerical squid model was validated with DPIV results, drag force and coefficient, required jet velocity to reach desired swimming velocity for the squid and propulsion efficiencies were calculated for different nozzle diameters. Besides, velocity and pressure contour plots showed the variation of velocity over the squid body and flow separation zone near the head of the squid model, respectively. The study revealed that viscous drag was nearly two times larger than the pressure drag for the squid's Reynolds numbers of ۴۴۲۵۰۰, ۹۴۹۹۰۰ and ۱۵۱۰۴۰۰. It was also found that the propulsion efficiency increases by ۲۰% when the nozzle diameter of a squid was enlarged from ۱ cm to ۲ cm.

کلمات کلیدی:

Computed tomography (CT), CFD, Drag, Propulsive efficiency, Longfin inshore squid

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