Performance of Overset Mesh in Modeling Generic Wakes for Underwater Swimming SUYASH VERMA, ARMAN HEMMATI, University of Alberta — The wakes of generic stationary, and oscillating square panels are examined using Overset Grid Assembly (OGA), implemented in OpenFOAM. Using Direct Numerical Simulation (DNS), this study focused on the accuracy and effectiveness of OGA in simulating wake, through combination of multiple meshes for domain and bodies respectively. First, the wake of a stationary square panel is considered at angles of attack between 0° and 60°. The results are compared with the numerical study of Taira et al. (2009) based on Immersed Boundary Method. Then, the wake of a pitching panel is examined at Re=2000 and St=0.2. Comparing the results with previous numerical (Senturk et al. 2018), and experimental (Buchholz, et.al. 2006) studies, show that the mean drag coefficient are in good agreement, and wake features were captured accurately. This provides sufficient evidence for the high capabilities of overset methodology in analyzing wake physics of sharp-edge bodies in oscillatory, and mixed motion. Future studies on complex shaped bodies are examined by combining fluid structure interaction with OGA, which also enables studying the effect of flexibility on hydrodynamic performance of propulsors.

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