Abstract Submitted
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Confinement effects on the development of the tip vortex of an elliptical hydrofoil[1] PRAVEEN KUMAR, KRISHNAN MAHESH, University of Minnesota — Tip vortices are widely studied due to their relevance to many engineering applications. In many cases, e.g. ducted propulsors, tip vortices evolve under confinement. The effects of confinement on the development of tip vortex is the subject of the present work. Large eddy simulations are performed for flow over a confined elliptical hydrofoil at an incidence angle of 12 degrees and a Reynolds number of 0.9 million based on root chord length and freestream velocity. Two different cases of tip gap, i.e. the perpendicular distance between the hydrofoil tip and the bottom wall, are simulated and compared to the experiments of Boulon et al. (J. Fluid Mech. (1998), 390: 1-23), who studied confined effects on tip vortex cavitation. Instantaneous and time-averaged flow fields are analyzed to understand the evolution of tip vortex under confinement.

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Praveen Kumar
University of Minnesota

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