Fluid flow over an elliptical cylinder undergoing a rotationally-oscillating motion ESAM ALAWADHI, Kuwait University — The near-wake behind an elliptical cylinder undergoing rotationally-oscillating motion will be simulated using the finite element method at a low Reynolds number, Re=200. The simulations will be carried out by varying the angle of attack between $\pm 10°$, $\pm 20°$, and $\pm 30°$, while the considered range of dimensionless oscillation frequency is $St_o/2 < St < 4 \times St_o$, where St_o is the natural Strouhal frequency of a stationary elliptical cylinder. The solver is coupled with a mesh movement scheme using the Arbitrary Lagrangian-Eulerian kinematics to simulate the flow-structural interaction. Fluid mechanics results will be presented in terms of instantaneous and time-average lift and drag coefficients, flow streamline, and vortices contours.

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