Numerical studies of the flow past a rotating sphere at $Re =$ 500 ERIC POON, University of Melbourne, GIANLUCA IACCARINO, Stanford University, ANDREW OOI, University of Melbourne, MATTEO GIACOBELLO, Defence Science and Technology Organisation — The flow past a rotating sphere is of interest in many engineering applications. A number of numerical studies have been performed to investigate the flow past a streamwise and transversely rotating sphere in the laminar flow regime ($Re \leq 300$, where Re is the Reynolds number based on freestream velocity, U_∞, and sphere diameter, d). In order to extend the understanding of a sphere's trajectory due to the rotating motion of the sphere, the flow past a rotating sphere is investigated for $Re = 500$. This Reynolds number sits in the unsteady asymmetric regime for a stationary sphere. The non-dimensional rotation rates, $0 \leq \Omega^* \leq 1$, are considered. The sphere rotation axis is orientated in two of the principle axis directions, namely streamwise and transverse directions. The effect of the rotation axis and Ω^* on the flow structures and the aerodynamic forces of a rotating sphere will be presented.

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