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Three-dimensional vortical structures around the fore- and hind-wings of dragonfly in hovering motion[1] JIHOON KWEON, HAECHEON CHOI, Seoul National University — In the present study, we investigate three-dimensional vortical structures around the fore- and hind-wings of dragonfly in hovering motion. The three-dimensional wing shape is based on that of *Aeschna juncea* (Noberg, JCP 1972) and numerically realized using an immersed boundary method (Kim et al., JCP 2001). The wing motion is modelled using sinusoidal functions and the mid-stroke angles of attack are 60°, 20° with the stroke plane angle 60°. The Reynolds numbers considered are 150 and 1000 based on the maximum translational velocity and mean chord length. During the downstroke, the strong wing- tip vortex produces the vortex ring and the downwash, and at the supination this vortex influences the force generation in a similar way to the normal hovering of *Drosophila*. During the stroke reversal, dipole vortices are observed all over the spanwise direction, but the time sequence of their development is different at different spanwise location. Near the wing tip, two vortex pairs are generated at the leading and trailing edges, respectively. To further understand the interaction between the wing and vortices, the wing-sectional force and torque are examined. The results will be discussed in the presentation.

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