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Wake Dynamics of Bat Flapping VAIBHAV JOSHI[1], RAJEEV JAIMAN, The University of British Columbia — Natural selection has evolved the geometry as well as mechanical properties of wings of a bat to achieve better flight performance, maneuverability and agility. The highly anisotropic and deformable membranes of the flapping wing and complex kinematics make their study more imperative for bio-inspired aerodynamic applications such as micro-air vehicles (MAVs). The current study is a first step towards understanding such complex flapping dynamics using a flexible multibody fluid-structure interaction framework. We aim to study the effect of the flexibility or compliance of the wing on the vortex dynamics and flight performance during hovering of the bat. We find that for the same power input to the flapping wing, the flexible compliant wing has better flight performance compared to its rigid counterpart. Moreover, the vortex structures generated supply more vorticity to the vortex ring patterns in the flexible wing leading to its large amplitude of deformation and unsteady lift coefficient.

[1]Membership Pending

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