

Abstract Submitted
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Vortex Formation Time of Animal Flight¹ CHRIS ROH, MORTEZA GHARIB, California Institute of Technology — A recurring feature of an animal's flight is a roll-up of free shear layers into swirling vortical structures. During these roll-up processes, the animals experience unsteady aerodynamic forces associated with the forming vortex that can enhance their propulsive magnitude and efficiency. Thus, a dimensionless number describing the vortex formation might prove useful in describing the similarity in animal flight across different taxa. The growth of the vortex is influenced by free stream velocity, wing kinematics, and wing morphology. Grounded in the vortex formation process, we defined various dimensionless times that arise from these parameters. Using the existing data in the literature, we compared dimensionless times to explore the possible uniformity across taxa and flight conditions ranging from hovering to cruising.

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