

Abstract Submitted
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Evolution and Control of the Leading Edge Vortex on an Unsteady Wing¹ JAMES AKKALA, JAMES BUCHHOLZ, University of Iowa — The development of the leading-edge vortex is investigated on a periodically plunging plate within a uniform free stream. Vortex circulation is governed primarily by the strength of the leading edge shear layer, which provides the primary source of circulation, and a substantial opposite-sign contribution due to the pressure-gradient-driven diffusive flux of vorticity from the suction surface of the plate. The latter has been shown to produce a substantial reduction in leading-edge vortex strength, and leads to the development of a secondary vortex whose evolution influences the interaction between the leading edge vortex and the surface, and thus alters the surface pressure gradients. Suction is applied in the vicinity of the secondary vortex in an attempt to regulate the aerodynamic loads in the presence of the leading-edge vortex. The effect on vorticity transport, leading-edge vortex dynamics, and the resulting aerodynamic loads is discussed.

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