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Effect of sweep on the laminar separated flows over finite-aspect-ratio wings[1] KAI ZHANG, KUNIHIKO TAIRA, University of California, Los Angeles — Separated flows over finite-aspect-ratio wings at low Reynolds numbers can exhibit rich wake dynamics across a range of aspect ratio, angles of attack, and sweep angles. In this talk, we focus on the effect of sweep on the three-dimensional flow physics behind finite NACA0015 wings. The post-stall wake of an unswept finite wing features a prominent tip vortex at the free end and unsteady wake vortices near the midspan. For a swept wing, a steady wake region forms from the midspan and the unsteady shedding region repositions toward the tip. The sweep-induced spanwise flow counteracts the roll-up of the flow over the wing tip, hindering the formation of the tip vortex. Corresponding to the spanwise variation of the vortical structures, the sectional lift coefficient is largest at the midspan, and decreases towards the wing tip. At large sweep angles, the wake of finite wings exhibits streaks of steady streamwise vortices that are embedded in the spanwise-undulated vortex sheets. In this talk, we discuss findings from a large parametric study and offer comparisons with wake behind unswept wings.

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