

Abstract Submitted
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Inviscid Instability of a Trailing Vortex SHERWIN MASLOWE, JAN FEYS, McGill University — A similarity solution for an aircraft trailing vortex valid far downstream of its wingtip was found by Batchelor (1964). Its linear stability has been the focus of many papers following the pioneering work of Lessen et al. (1974). In the parallel flow version of Batchelor's solution, the azimuthal and axial velocities can be written $W = e^{-r^2}$ and $V = q(1 - e^{-r^2})/r$. The swirl component $V(r)$ is stabilizing and for $q > 2.31$ the vortex is stable. It was pointed out, however, by Spalart (1998) that closer to the aircraft a family of profiles found by Moore & Saffman (1973) provide a more accurate description of the axial flow. Comparing with the recent experiments of Lee & Pereira (2010), we find that the latter profiles better describe the axial flow deficit in the vortex core. We present results for the Moore & Saffman profiles showing them to be considerably more unstable than the Batchelor vortex.

Sherwin Maslowe
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