

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Eulerian and Lagrangian Analysis of a Simulated unsteady Flow Behind a Circular cylinder¹ KEITH HOLMES, MELISSA GREEN, Syracuse University — The unsteady wake behind a circular cylinder is numerically simulated and analyzed utilizing various Eulerian methods and the Lagrangian finite-time Lyapunov exponent (FTLE). The objective is to identify and distinguish among shed vortices in the wake, and particular attention is given to the near wake immediately downstream of the cylinder. The Eulerian methods capably determine regions of the flow associated with greatest magnitude of vorticity in the near wake, as has been shown previously. Ridges of the FTLE field are able to objectively identify structures in the near wake by outlining the boundaries between vortices. This includes boundaries among structures of the same sign, a distinction not possible using the Eulerian methods. The formation of these boundaries help to distinguish between structures still developing around the cylinder surface and those that have been shed from the cylinder.

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Date submitted: 03 Aug 2012

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