

Abstract Submitted
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Impact of Noise on the Onset of Vortex Breakdown¹ BRUNO WELFERT, JUAN LOPEZ, Arizona State University, FRANCISCO MARQUES, Universidad de Catalunya, Spain — The effect of noise on the dynamical properties of a fluid flow in a bounded container is studied. The flow is modelled by the Navier-Stokes equations. The noise, which is defined by a random process with predefined statistical properties, is introduced in a physically relevant manner, via the boundary conditions. The stability of critical states of the deterministic system is analyzed via the simultaneous linearization of the system in physical and probability spaces. The resulting equations form a stochastic system, which depend on the deterministic critical state and on a Wiener process whose auto-correlation function is directly connected to the type of noise as well as on the critical state itself. The behavior of the stochastically forced system around critical states is explored numerically. This work represents a continuation of the preliminary results presented at the APS-DFD annual meeting in 2005 in Chicago.

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