

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Fully localised nonlinear energy growth optimals in pipe flow

CHRIS PRINGLE, Coventry University, ASHLEY WILLIS, University of Sheffield, RICH KERSEWELL, University of Bristol — In wall-bounded shear flows such as pipe flow, transition to turbulence remains a problem of great theoretical and practical importance. The transition is typically abrupt, occurs at flow rates for which the underlying base flow is stable, and is triggered by disturbance amplitudes much smaller than the ensuing turbulent state. Progress has recently been made in identifying the smallest perturbation capable of triggering turbulence (the minimal seed) using energy growth optimals, but only in small periodic domains. Here we present a new fully-localised (non-periodic in the streamwise direction) energy growth optimal for pipe flow. The perturbation approaches the experimentally-relevant minimal seed for transition in long pipes.

Chris Pringle
Coventry University

Date submitted: 01 Aug 2014

Electronic form version 1.4