

Efficient solution techniques in swirling flows linear stability problems

Florica Ioana Dragomirescu

Department of Mathematics, University "Politehnica" of Timisoara

Abstract

Hydrodynamic stability of swirling flows (with applications in turbomachinery) is a subject which addresses the mathematical modeling, the dynamic and stability of swirling flows, as well as the vortex breakdown phenomenon, which are all examples of fundamental problems in fluid dynamics. The main idea in a stability analysis of a swirling flow is to provide instability characteristics of the flow in order to clearly identify the role that this instability can play in the evolution of the fluid system. Some directions for an improved methodology to investigate these characteristics, based on a variational formulation of the governing equations, are presented along with the corresponding problems. ¹

¹Mathematical Subject Classification(2008): *65P40, 65Y20, 47A75*

Keywords and phrases: *swirling flow, spectral methods, trailing vortex*