The linear stability analysis of swirling flows in a finite-length pipe RUI GONG, SHIXIAO WANG, Auckland University, ZVI RUSAK, Rensselaer Polytechnic Institute — The linear stability of an inviscid, axisymmetric and rotating columnar flow in a finite length pipe against general type of perturbations is studied. The perturbation mode is subject to a set of boundary conditions that may reflect the physical situation of the swirling flow in a finite-length pipe. This type of stability problem was first studied by Wang and Rusak (1996). The current study generalized their original analysis (valid for axisymmetric perturbations) to a stability analysis of general type of perturbations. The underlying physical mechanism of the unstable mode is examined and discussed in terms of the energy transfer mechanism between the perturbations and the base flow.

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