Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

On swirling flow in a rotating sectioned cylinder MATS NIGAM, Noss AB — We consider a rotating fluid in a sectioned cylinder with radial inflow and axial outflow. A reduced model is obtained by assuming a weak variation in the azimuthal direction and applying a Galerkin method. The asymptotic analysis for small Rossby numbers yields a third order ODE for the swirl-velocity. In the limit of infinite Reynolds number, the equation can be solved analytically. The solution shows strong qualitative similarities with the axially symmetric case. The small radial-to-axial flow is given by a stream-function which varies linearly in the axial direction and induces an order one swirl. Finally, estimates of the radial pressure drop and the induced torque are presented for various outlet configurations.

Mats Nigam
Noss AB

Date submitted: 04 Aug 2005 Electronic form version 1.4