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Mid-plane symmetry breaking in finite (axisymmetric) counter-rotating disk flow. RICHARD HEWITT, ANDREW HAZEL, University of Manchester — We consider the steady flow of an incompressible fluid driven by the counter rotation of two co-axial disks of *finite* radius. It is known that a von Kármán similarity solution is available in an infinite geometry and that this solution possesses a pitchfork bifurcation that breaks the mid-plane symmetry. In this work we seek similar bifurcations in the finite-domain flow and compare the resulting bifurcation structure with the similarity solution for increasing aspect ratios. We thus assess the applicability of the nonlinear similarity solutions to finite domains and explore the sensitivity of this structure to edge conditions that are implicitly neglected when assuming a self-similar flow. We show that the nonlinear structure of the finite-domain flow (even for large aspect ratios) may be rather different both quantitatively and qualitatively from the self-similar flow for general edge conditions.

Peter Duck
University of Manchester

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