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Quasiperiodic flow in an axially forced Taylor-Couette system
MARC AVILA, FRANCISCO MARQUES, Universitat Politecnica de Catalunya, JUAN M. LOPEZ, Arizona State University, ALVARO MESEGUER, Universitat Politecnica de Catalunya — Time-periodic forcing of hydrodynamic systems can be used as a mechanism to delay transition to secondary flows. However, parametric resonance may occur when the forcing excites some natural frequency of the system, leading to Neimark–Sacker bifurcations which can give rise to more complex flows or even turbulence. Therefore, there is a tradeoff between enhancing stability and catastrophic transition. Periodic axial motion of the inner cylinder can be used in the Taylor–Couette system to delay the onset of Taylor vortices. Although this mechanism is very efficient, for low frequencies of the forcing Neimark–Sacker bifurcations occur, so that the transition is to non-axisymmetric vortices featuring a new natural frequency (Marques & Lopez). In this work we study the complex flows arising in the neighbourhood of these bifurcations, including quasiperiodic motion as well as regions of frequency locking. The results will be compared with the recent experiments by Sinha *e*t al.

MARQUES, F. & LOPEZ, J. M. 2000 Spatial and temporal resonances in a periodically forced hydrodynamic system. *P*hysica D **136**, 340-352.
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