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bifurcations of driven cavity flow and their implications for mixing HASSAN ARBABI, IGOR MEZIC, University of California, Santa Barbara — We use the Koopman operator theory to study the sequence of bifurcations in 2D driven cavity flow. By extracting the Koopman modes (analogue to normal modes of linear-systems theory), we identify the dominant flow structures at different subranges of Reynolds number. We also use the eigenvalues of the Koopman operator to study the structural dependence of the flow on the Reynolds number and classify the asymptotic state of the unsteady flow into periodic, quasi-periodic and possibly chaotic categories. Ultimately, we perform a combined study of the Koopman modes and eigenvalues involved with each category to study the effect of each bifurcation on mixing properties of the cavity flow.

Hassan Arbabi
University of California, Santa Barbara

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