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Use of targeted energy transfer to delay Kármán vortex shedding and suppress vortex-induced vibration in flow past a cylinder RAVI K.R. TUMKUR, RAMON E. CALDERER, LAWRENCE A. BERGMAN, ALEXANDER F. VAKAKIS, ARIF MASUD, ARNE J. PEARLSTEIN, University of Illinois at Urbana-Champaign — For two-dimensional flow past a circular cylinder whose motion is constrained by a linear spring to be perpendicular to the mean flow, we report computations showing that "targeted energy transfer" using a nonlinear energy sink (NES; consisting of a mass, a linear damper, and an essentially nonlinear spring) not only can reduce the amplitude of the cylinder motion, but can also increase the critical Reynolds number (Re) at which the Kármán vortex street first appears. Absent the NES, the critical Re at which vortex shedding (and hence cylinder motion) sets in is determined as a function of the stiffness of the linear spring. Over a wide range of stiffness, the NES is shown to delay the onset to higher Re.

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