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Flow-induced oscillations of a pipe conveying fluid with base excitation GARY CHANG, YAHYA MODARRES-SADEGHI — We study various dynamic instabilities in a cantilevered pipe conveying fluid with base excitation. A plain cantilevered pipe conveying fluid loses its stability by a Hopf bifurcation, leading to either planar or non-planar flutter for flow velocities beyond the critical flow velocity for the Hopf bifurcation. If a mass is attached to the end of the pipe (a so-called added mass), the resulting dynamics becomes much richer, showing 2-D and 3-D quasi-periodic and chaotic oscillations at high flow velocities. In this work, we consider a cantilevered pipe subjected to either a periodic base excitation, or a periodic point excitation at a given location along the pipe, and study the response of the fluid-conveying pipe in 2-D and 3-D. It turns out that by selecting the right frequency and amplitude for the external excitation, we can force the non-planar oscillations to planar ones.

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