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Flow-induced instabilities of shells of revolution conveying fluid GARY HAN CHANG, Umass Amherst — In the present work, we study flow-induced instabilities of an axis-symmetric shell of revolution with an arbitrary non-uniform cross-section due to uniform or pulsatile flow. We consider a fully-coupled fluid-structure interaction model, which we solve using a method that combines the Galerkin technique with the boundary element method (BEM). Several modes in the axial direction have been used in the numerical solution and the mode number in the circumferential direction has been chosen as n = 5. As the flow velocity is increased, the system loses its stability through divergence and the shell buckles. We have also conducted experiments on shells of revolution, made of silicon rubber, conveying fluid in order to observe their flow-induced instabilities. Experimental results show that thin shells of revolution conveying fluid lose their stability by divergence with asymmetric mode-shapes, in agreement with our theoretical results.

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