

Hickerson, A. I.; Gharib, M.

On the resonance of a pliant tube as a mechanism for valveless pumping. (English)

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Summary: Valveless pumping can be achieved through the periodic compression of a pliant tube asymmetrically from its interfaces to different tubing or reservoirs. A mismatch of characteristic impedance between the flow channels is necessary for creating wave reflection sites. Previous experimental studies of the behaviour of such a pump were continued in order to demonstrate the wave mechanics necessary for the build-up of pressure and net flow. Specific measurements of the transient and resonant properties were used to relate the bulk responses to the pump mechanics. Ultrasound imaging through the tube wall allowed visualization of the wall motion concurrently with pressure and flow measurements. For analysis, a one-dimensional wave model was constructed which predicted many of the characteristics exhibited by the experiments.

MSC:

76-05 Experimental work for problems pertaining to fluid mechanics

74F10 Fluid-solid interactions (including aero- and hydro-elasticity, porosity, etc.)

Cited in **8** Documents

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