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The effect of resonant driving and damping on dynamic suction pumping NICHOLAS BATTISTA, LAURA MILLER, University of North Carolina at Chapel Hill — Impedance pumping (or dynamic suction pumping) drives flow through a flexible valveless tube with a single region of actuation. It is a profoundly complex pumping mechanism given that the flow velocities and directions generated depend nonlinearly upon the driving frequency, material properties, duty factor, and location of the actuation point. Given the simplicity of its actuation, it is used in biomedical devices and is thought to generate flow in a number of biological systems. In this study, we numerically simulate an elastic tube with mass using the immersed boundary method and explore the performance when it is driven over a range of frequencies and damping factors. Flow is maximized during resonance, and bulk transport is minimal when the tube is over-damped.

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