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Peristaltic pumping in an elastic tube: feeding the hungry python
DAISUKE TAKAGI, University of Cambridge, NEIL BALMFORTH, University of British Columbia — Biological ducts convey contents like food in the digestive system by peristaltic action, propagating waves of muscular contraction and relaxation. The motion is investigated theoretically by considering a radial force of sinusoidal or Gaussian form moving steadily down a fluid-filled axisymmetric tube. Effects of the prescribed force on the resultant fluid flow and elastic deformation of the tube wall are presented. The flow can induce a rigid object suspended in the fluid to propel in different ways, as demonstrated in numerous examples.

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