

Abstract Submitted  
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**Asymptotic investigations into the ‘fluid mechanical sewing machine’** MAURICE BLOUNT, JOHN LISTER, ITG, DAMTP, University of Cambridge — The fall of a slender viscous thread from a nozzle onto a moving horizontal belt exhibits a wide range of behaviour. Steady motion is observed above a critical belt speed. Below this speed the thread undergoes a buckling instability, and lays down on the belt a variety of stable, periodic patterns referred to as a ‘fluid mechanical sewing machine’. We expand on previous theoretical progress [1] by including the effects arising from the resistance of the thread to bending. While the bending resistance of a slender viscous thread is small, under certain circumstances it has a dominant effect. We work in the asymptotic limit of a slender thread, and investigate the full range of steady solutions. An asymptotic refinement to the estimate derived in [1] for the onset of buckling instability is presented, and the behaviour of the thread near onset is discussed. [1] S. Chiu-Webster & J.R. Lister, *J. Fluid Mech.* **569**, 89-111.

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