

Abstract Submitted  
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**The death of the fluid mechanical sewing machine: viscoelastic effect** BERNARDO PALACIOS, Universidad Nacional Autonoma de Mexico, STEPHEN W. MORRIS, University of Toronto, ROBERTO ZENIT, Brown University — In this work we study the fall of a viscous filament onto a moving surface. While the problem has been studied extensively for Newtonian fluids, referred to as the fluid-mechanical sewing machine, the effects of considering other complex fluids have not been explored to date. We replicate the setup used for Newtonian fluids, issuing a fluid filament from a nozzle from certain vertical distance from a moving substrate to observe it coil and stretch simultaneously. The fluid considered is, instead, a Boger fluid (viscoelastic but with constant viscosity). Our experiments show that, for similar conditions, the coiling instability does not appear if the fluid has sufficient elasticity. In most cases, the fluid mechanical sewing machine effect is not observed. Instead, a largely stable fluid catenary is observed. The shape of the catenary is characterized considering a Deborah number and a dimensionless height. A map of the conditions to kill the fluid mechanical sewing machine effect is presented in terms of these two dimensionless groups.

Roberto Zenit  
Brown University

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