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Dynamics of Viscoelastic Filaments SUMEET THETE, Air Products and Chemicals, Inc., BRAYDEN WAGONER, School of Chemical Engineering, Purdue University, PRITISH KAMAT, Dow Inc., MICHAEL HARRIS, OSMAN BASARAN, School of Chemical Engineering, Purdue University — In processes as diverse as ink-jet printing and crop spraying, slender liquid filaments are formed. These filaments may contract into a single drop or breakup into multiple smaller drops. In the aforementioned and most other applications, the latter outcome is highly undesirable as it will mar the printing quality or increase the portion of the spray fluid that can drift. In many applications, the working fluids may contain additives that render them viscoelastic in nature. While the dynamics of Newtonian filaments have been studied extensively, that of viscoelastic filaments remains largely unexplored. Using the conformation tensor formalism of Pasquali and Scriven (Pasquali and Scriven, J. non-Newtonian Fluid Mech., 2004) implemented in a numerical algorithm based on the SUPG/FEM formation, we present the results of a study on the fate of viscoelastic filaments.

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