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Nonlinear Response of Bio-Polymers Subject to Stretching Flow with Thermal Noise MINGGE DENG, Brown University, LEOPOLD GRINBERG, T.J. Watson Research Center, BRUCE CASWELL, GEORGE KARNIADAKIS, Brown University — The dynamics of elastic filaments subject to hydrodynamic forces exhibits complex nonlinear dynamics in the neighborhood of stagnation points in the flow. Here, the motion of a single in-extensible bio-polymer with anisotropic friction tensor subjected to a stretching flow is modeled with stochastic differential equations as well as dissipative particle dynamics simulations. Our results show that the negative tension induces a stretch-coil transition beyond a critical value, where the noise is amplificated due to the interaction between thermal noise and nonlinear effects.

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