

Abstract Submitted
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Self-sustaining oscillations of the falling sphere in some viscoelastic fluids¹ YOUNG JU LEE, Rutgers, The State University of New Jersey, CHENSONG ZHANG, The Pennsylvania State University, 1 TEAM — We investigate the mathematical models for the unusual phenomenon observed in motion of the sphere falling through the wormlike micellar fluids; a sphere falling in a wormlike micellar fluids undergoes nontransient and continual oscillations. Using a novel numerical techniques, we identified right models in our simulations by exploring the parameter regimes of models that have been unexplored previously for the flow past a sphere and reproduce the self-sustaining, continual, (ir)regular and periodic oscillations. Our results show that the flow instability can be correlated with the critical value of the velocity gradient as observed in experiments.

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