UNIVERSITY OF CALIFORNIA
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APPLIED MATHEMATICS SEMINAR 291

Simulations of Particles in a Thermally Fluctuating Viscoelastic Fluid

Date: **10/4/19** Time: **3:00 PM** Location: **COB1 265**	**Christel Hohenegger** Associate Professor, Mathematics Professor of Utah	For more information, contact : **Changho Kim** **ckim103@ucmerced.edu**

Abstract

Many biological fluids, like mucus and cytoplasm, have prominent viscoelastic properties, which lead to the subdiffusive behavior of immersed passive particles. We propose a viscoelastic generalization of the Landau-Lifschitz Navier-Stokes fluid model for particles that are passively advected by such a medium and develop a simulation techniques based on the theory of stationary Gaussian processes. In contrast to the stochastic immersed boundary method for viscous fluids, which relies on step-by-step simulation techniques exploiting the Markov property, our method is based on the numerical evaluation of the covariance associated with individual fluid modes. The numerical method is spectral, meshless and uses results from the simulations of Generalized Langevin Equations.The implementation presents many practical problems, mostly stemming from the fact that the physical regime of interest corresponds to a situation where the memory kernel has a very slow (power law) decay. We will also discuss the practical application of the simulations in answering rheological questions, namely to extract mechanical properties of the fluid from recorded path data.