The Generalized Langevin Equation is commonly used to describe the velocity of microparticles in viscoelastic fluids. Formally, the Generalized Langevin Equation (GLE) is written

\[ m\ddot{x}(t) = -\gamma \dot{x}(t) - \Phi'(x(t)) - \int_{-\infty}^{t} K(t-s)\dot{x}(s)ds + F(t) + \sqrt{2\gamma}W(t) \]

where \( \Phi(x) \) is a non-linear potential well, \( W(t) \) is a Brownian motion, and \( F(t) \) is a stationary, mean zero and Gaussian process satisfying \( E(F(t)F(s)) = K(t-s) \). Describing the long-term behavior of sub-diffusive GLEs in non-linear potentials is a long-standing open problem. We will look at recent advances in establishing existence and uniqueness of a stationary distribution for an infinite-dimensional Markov representation of the GLE. If time permits, we will also discuss asymptotic behaviors of the GLE in different limits, namely, the small-mass limit and the white noise limit. (Received February 16, 2018)