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New Kinematic Model in comparing with Langevin equation and Fokker Planck Equation KYOUNG LEE, ZHIJIAN WANG, ROBIN GARDNER, North Carolina State University — An analytic approximate solution of New Kinematic Model with the boundary conditions is developed for the incompressible packing condition in Pebble Bed Reactors. It is based on velocity description of the packing density in the hopper. The packing structure can be presented with a jamming phenomenon from flow types. The gravity-driven macroscopic motions are governed not only by the geometry and external boundary conditions of silos and hoppers, but by flow prosperities of granular materials, such as friction, viscosity and porosity. The analytical formulas for the quasi-linear diffusion and convection coefficients of the velocity profile are obtained. Since it was found that the New Kinematic Model is dependent upon the granular packing density distribution, we are motivated to study the Langevin equation with friction under the influence of the Gravitational field. We also discuss the relation with the Fokker Planck Equation using Detailed balance and Metropolis-Hastings Algorithm. Markov chain Monte Carlo methods are shown to be a non-Maxwellian distribution function with the mean velocity of the field particles having an effective temperature.

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