DESCRIBING A BROWNIAN PARTICLE

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A Langevin equation for a Brownian particle when its mass is taken to zero is a singular limit. This limit, called the Smoluchowski-Kramers approximation, can be i nterpreted as a Stochastic differential equation with an Itô stochastic integral. However, when the friction coefficient of the Langevin equation depends on the particle's position, the Smoluchowski-Kramers approximation has a spurious drift. I will indicate what the differences are between this situation and the constant friction case. I will show how this spurious drift is obtained and can be interpreted as a construction of a stochastic integral.