

The Smoluchowski-Kramers approximation for the Langevin equation with reflection

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Abstract

According to the Smoluchowski-Kramers approximation, the solution of the equation $\mu\ddot{q}_t^\mu = b(q_t^\mu) - \dot{q}_t^\mu + \sigma(q_t^\mu)\dot{W}_t$, $q_0^\mu = q$, $\dot{q}_0^\mu = p$ converges to the solution of the equation $\dot{q}_t = b(q_t) + \sigma(q_t)\dot{W}_t$, $q_0 = q$ as $\mu \rightarrow 0$. We consider here a similar result for the Langevin process with elastic reflection on the boundary.