1108-60-79   **H D Nguyen**, **N H Du** and **G Yin*** (gyin@math.wayne.edu), Department of Mathematics, Wayne State University, Detroit, MI 48202. *Dynamic Systems under Random Perturbations: A Multi-scale Approach.* Preliminary report.

This work examines stochastic differential equations with both rapidly-varying random switching and small diffusion. A multi-scale formulation is proposed using two small parameters ε and δ. Associated with the given systems, there are averaged or limit systems. Suppose that for each pair of the parameters, the solution of the corresponding equation has an invariant probability measure $\mu^{\varepsilon,\delta}$, and that the averaged equation has a limit cycle in which there is an averaged occupation measure μ^0 for the averaged equation. Our main effort is to prove that $\mu^{\varepsilon,\delta}$ converges weakly to μ^0 as $\varepsilon \to 0$ and $\delta \to 0$ under suitable conditions. In addition, our results are applied to a stochastic predator-prey model for demonstration. (Received December 29, 2014)