

Homogenization of Hamilton-Jacobi Equations and Related Inverse Type Problems

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The speaker will first present some recent results on the homogenization theory for Hamilton-Jacobi equations in dynamic random environments. The goal of homogenization is to determine some effective environment that is non-oscillatory but characterizes the averaged effect of the heterogeneous media on the equation. Though the homogenization theory for Hamilton-Jacobi equation is well studied for static environments, some difficulty persists in the dynamic setting due to the lack of uniform Lipschitz controls of the solutions. The presented results, albeit being partial, provide new unified approaches for qualitative stochastic homogenization. For the second part of the talk, the speaker will report some new studies on finer properties of the effective Hamiltonian, and some information about the environment that can be deduced from the effective Hamiltonian. This is, in some sense, inverse type problems and the speaker will show some examples in the periodic setting. This talk is based on joint works with P.E. Souganidis, H.V. Tran and Y. Yu.