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Elena Kosygina* (elena.kosygina@baruch.cuny.edu), **Atilla Yilmaz** and **Ofer Zeitouni**.

Homogenization of a class of one-dimensional non-convex viscous Hamilton-Jacobi equations with random potential. Preliminary report.

We prove the homogenization of a class of one-dimensional viscous Hamilton-Jacobi equations with random Hamiltonians that are non-convex in the gradient variable. Due to the special form of the Hamiltonians, the solutions of these PDEs with linear initial conditions have representations involving exponential expectations of controlled Brownian motion in a random potential. The effective Hamiltonian is the asymptotic rate of growth of these exponential expectations as time goes to infinity and is explicit in terms of the tilted free energy of (uncontrolled) Brownian motion in a random potential. The proof involves large deviations, construction of correctors which lead to exponential martingales, and identification of asymptotically optimal policies. (Received February 19, 2018)