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Physical solutions of the Hamilton–Jacobi equation

We consider a Lagrangian system on the d-dimensional torus, and the associated Hamilton–Jacobi equation. Assuming that the Aubry set of the system consists in a finite number of hyperbolic periodic orbits of the Euler–Lagrange flow, we study the vanishing-viscosity limit, from the viscous equation to the inviscid problem. Under suitable assumptions, we show that solutions of the viscous Hamilton–Jacobi equation converge to a unique solution of the inviscid problem.