Singular perturbations
and Aubry-Mather theory

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Abstract: The viscosity solution approach to singular perturbation problems was initiated by Evans and Ishii and pursued by many authors. But since a key ingredient in this framework is the uniqueness of the viscosity solution of the limit equations, some interesting problems such as the ones arising in Freidlin-Wentzell large deviations theory have been excluded by this approach. In this cases, in fact, the limit equation has infinite many solutions. We show how this difficulty can be overcome by exploiting the metric approach to Hamilton-Jacobi equations recently introduced in Fathi-Siconolfi.