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Stochastic perturbations of passive scalars and small noise inviscid limits

We consider a class of invariant measures for a passive scalar driven by an incompressible velocity field on a periodic domain. The measures are obtained as limits of stochastic viscous perturbations. We prove that the span of the H^1 eigenfunctions of the transport operator contains the support of these measures, and apply the result to a number of examples in which explicit computations are possible (relaxation enhancing, shear, cellular flows). In the case of shear flows, anomalous scalings can be handled in view of a precise quantification of the enhanced dissipation effects due to the flow.