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Maximal stochastic transport in the Lorenz equations SAHIL AGARWAL, JOHN WETTLAUFER, Yale University, University of Oxford — We calculate the stochastic upper bounds for the Lorenz equations using an extension of the background method. In analogy with Rayleigh-Benard convection the upper bounds are for heat transport versus Rayleigh number. As might be expected the stochastic upper bounds are larger than the deterministic counterpart of Souza and Doering (2015), but their variation with noise amplitude exhibits surprising behavior. Below the transition to chaotic dynamics the upper bounds increase monotonically with noise amplitude. However, in the chaotic regime this monotonicity is lost; at a particular Rayleigh number the bound may increase or decrease with noise amplitude. The origin of this behavior is the coupling between the noise and unstable periodic orbits. This is confirmed by examining the close returns plots of the full solutions to the stochastic equations. Finally, we note that these solutions demonstrate that the effect of noise is equivalent to the effect of chaos.

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