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Transport in the Stochastic Lorenz System SCOTT WEADY, SAHIL AGARWAL, LARRY WILEN, Yale University, JOHN WETTLAUFER, Yale University; Mathematical Institute, Oxford University; Nordita, Royal Institute of Technology and Stockholm University — We study transport in the stochastic Lorenz system mathematically, computationally and using a circuit model. The circuit model provides a very efficient method for computing long time averages of polynomials in the variables X, Y, and Z with real-time updates. In particular, we use this approach to the quantity $\langle XY \rangle$, which is the heat transport corresponding with Rayleigh-Bénard convection. We interpret our results in the framework of analytical stochastic upper bounds [1] for $\langle XY \rangle$ versus ρ (the reduced Rayleigh number), as well as against numerical solutions. For a given ρ we find a rich dependence of the transport on both noise color and amplitude due to the detailed coupling of noise with Unstable Periodic Orbits.

[1] S. Agarwal and J. S. Wettlaufer, Maximal stochastic transport in the Lorenz equations, *Phys. Lett. A* **380**, 142 (2016).

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