

Abstract Submitted
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The Influence of Noise on Turbulent Transport.¹ J.A. KROMMES, Princeton University — Recently there have been considerable discussions and contradictory conclusions about the possible influence of numerical noise on measured turbulent fluxes.² In the present work, some of the conceptual and analytical foundations of noise-related calculations are reconsidered, and some paradoxes are resolved. An elementary model involving coupled random processes shows that extra noise (e.g., related to numerical sampling errors in δf particle simulations³) can reduce total transport. (Intuition to the contrary stems from oversimplified models involving independent, additive, and passive advection velocities.) This result is interpreted in terms of the structure of the steady-state spectral balance equation for turbulence in the presence of discreteness-induced noise.⁴ The relationship of the Fluctuation–Dissipation Theorem to general nonequilibrium statistical balances is also discussed.

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