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The effects of energy dissipation rate surrogates on the inertial-range intermittency and refined similarity hypothesis SABA ALMALKIE[1], STEPHEN DE BRUYN KOPS[2] — Due to limitations in making multi-point instantaneous measurements of a turbulent flow field at sufficiently high resolution to accurately compute the dissipation rate of turbulence kinetic energy, direct calculation of local and averaged dissipation rates are surrogated by using estimates based on more easily measured quantities. The underlying assumptions behind the surrogates and the accuracy of the surrogates for estimating the dissipation rate are investigated by using direct numerical simulations of flow fields including homogeneous isotropic turbulence, stratified turbulence, and plane channel flow. Three commonly used surrogates of local and locally averaged energy dissipation rates, *i.e.*, one-dimensional, spectral, and structure function-based estimates, are selected for this study. The statistical behaviors of these surrogates are analyzed and compared with those of the directly computed dissipation rates. The main emphasis is on inertial range intermittency, deviation from the refined similarity hypothesis, and scale sensitivity of the results.

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