Kinetic energy gradient induction due to an integral scale inhomogeneity

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Turbulent kinetic energy decay

\( E_1 = \text{the larger scale region}, \ E_2 = \text{smaller scale region} \)

\[
\frac{E_1(t)}{E_2(t)} \quad \text{for different scale ratios:} \quad \frac{l_1}{l_2} = 2.8, \ 2.1, \ 1.5 \quad \text{(Re}_\lambda = 150)\]

\[n_2 = -1.3, \ -1.5, \ -1.7 \quad \text{for} \ n_1 = -1.1\]
Mixing layer intermittency

Velocity skewness and kurtosis, component in the mixing direction: maximum in the mixing layer

\[ S_{\text{max}}(t) \]

\[ K_{\text{max}}(t) \]

\( Re_\lambda = 150 \)

\( l/l_2 = 2.8 \)
\( l/l_2 = 2.1 \)
\( l/l_2 = 1.5 \)
Mixing layer intermittency

Intermittency vs. instantaneous kinetic energy ratio

Each point represents a different instant
Mixing layer intermittency

$\Delta(t)$ is the mixing layer thickness
domain length $L = 41.4$ cm in the mixing direction

Note: each point corresponds to one instant, but the time step in
the data with $E_1/E_2 = 6.7$ is larger.