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Vorticity Fluctuations Require a Two-term Asymptotic Represenттion RONALD PANTON, Retired — Channel flow DNS data produced by several authors is analyzed. In the inner region, the vorticity fluctuations, $<\omega i \omega i>$, require two-term asymptotic expansions. The first terms are scaled by the mixed velocity (U0 uτ)1/2. They are the viscous response to imposed potential fluctuations, decay exponetially, and therefore do not require matching terms in the outer region. The first term is zero for the normal component, $<\omega y \omega y>$. The second terms are scaled by uτ with a gauge function uτ+(Reτ). They are active in the turbulence. In the log region they have an overlap behavior $\sim$ Ci / y+ or Co / (y/δ). This behavior demands a rescaling in the outer region where the proper vorticity scale is $\tau\eta = \nu$ / ε = (νh / uτ3)1/2. This is the Kolmogorov time scale appropriate for viscous dissipation. In the outer region all components scale nicely with Reτ and have similar magnitudes.

Ronald Panton
Retired

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