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Streamwise Reynolds Stress Partitioned into Active and Inactive Correlations. RONALD PANTON, U. Texas — The streamwise Reynolds stress $<uu>$ in wall layers has a peak near the wall that is an order of magnitude higher that the shear stress ¡uv¿. Townsend attributed this to an "inactive" swirling motion $u - w$ that does not contribute to the shear stress. The peak continues to increase with Reynolds number. Degraaff and Eaton (JFM, **422,** p 319) and Metzger and Klewicki (P of F, **13**, p 692) have essentially shown that the peak increases as $<uu>_{MAX}/u_*^2 \sim U_0/u_*$. With these facts in mind, it is proposed that the inactive motion u_I scales with $(U_0 u_*)^{1/2}$, and the active motion u_A scales with u_*. With these ideas, an asymptotic expansion for the streamwise stress consists of three terms with gauge functions 1, $(u_*/U_0(Re^*))^{1/2}$, and$u_*/U_0(Re^*)$: $<uu>/(u_*U_0) \sim f_0(y) + f_1(y)(u_*/U_0)^{1/2} + f_2(y)(u_*/U_0)$. The terms,$f_0(y)$ & $f_2(y)$,represent the autocorrelations of the inactive and active motions respectively, while the$f_2(y)$ term represents the cross-correlation of those motions. This form appears to be valid for both inner and outer regions. Data for channel flow was analyzed by making crude approximations for $f_1(y)$ & $f_2(y)$and solving for $f_0(y)$.Equations fitted to $f_0(y)$ allow a composite expansion to predict the streamwise Reynolds stress as a function of y and Re_*.

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