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Corrected Hot-wire Measurements of Stream-wise Turbulence Intensity from Several ZPG Boundary Layers[1] HASSAN M. NAGIB, RICHARD D. DUNCAN, IIT, Chicago, PETER A. MONKEWITZ, EPFL, Switzerland — Current experimental activity aimed at resolving the scaling of stream-wise turbulence intensity profiles $\overline{uu}(y)$ with Reynolds number in turbulent flat plate boundary layers has brought the largely unresolved issue of correcting systematic errors in hot-wire measurements of $\overline{uu}(y)$ into focus. Recently, we demonstrated the effectiveness of a heuristic scheme to generate unique $\overline{uu}^+(y^+; Re_{\delta^*})$ profiles from selected data sets obtained with single hot-wires of widely different length, aspect ratio and construction over a large Reynolds number range of $4,000 < Re_{\delta^*} < 50,000$. The scheme has been applied to a larger number of data sets in zero pressure gradient (ZPG) boundary layers and is used here to re-examine the scaling of the stream-wise turbulence intensity profiles. These results confirm or reveal Reynolds number trends of features such as the peak intensity, in addition to pinpointing limitations of some of the data sets in the literature. The best scaling for $\overline{uu}(y)$ is examined in different parts of the boundary layer as a function of Reynolds number.

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