Errata: A Coherent Structure Model of the Turbulent Boundary Layer and its Ability to Predict Reynolds Number Dependence

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ERRATA

A coherent structure model of the turbulent boundary layer and its ability to predict Reynolds number dependence

By R. E. Falco

An error in the expression for the curve fit of C_y/δ against R_θ has been discovered subsequent to publication. This was due to a software output statement error in the curve-fitting program. It influences all expressions derivative from it. The correct expression for the curve fit is $C_y/\delta = 30.5R_\theta^{-0.71}$. The derivative expressions and their locations in the paper, along with the corrected expressions are indicated below. As a consequence the curve fit of typical eddies in figure 9 of the paper is also incorrect. During the re-evaluation, we had the opportunity to use the experimentally measured values of u_τ obtained with the pocket data, and found that they resulted in a trend that more closely follows the corrected typical eddy data. The corrected typical eddy curve fit and pocket data are replotted below (a dashed line parallel to the typical eddy fit has been put through the pocket data for reference). The conclusion about the similar dependencies between the pockets and the typical eddies remains unchanged; however, the typical eddy scale is approximately 50% larger than the pocket scale. The normalization of the turbulence intensity and Reynolds stress data shown in figures 10b and 11b of the original paper has been recalculated using the correct expressions, and are also shown below. Although there is a quantitative shift of the data, the quality of the data collapse is seen to be essentially unaffected. Hence, all of the conclusions reached remain the same.

Corrections to text

Page 107, figure 3 caption, *for* $30.5R_\theta^{-0.758}$ *read* $30.5R_\theta^{-0.71}$
Page 108, line 19, *for* $30.5R_\theta^{-0.758}$ *read* $30.5R_\theta^{-0.71}$
Page 109, in the final three lines, *for* $0.646R_\theta^{0.917}$ *read* $0.76R_\theta^{0.92}$,
$\qquad\qquad\qquad\quad$ *for* $19.7R_\theta^{0.159}$ *read* $23.2R_\theta^{0.21}$,
$\qquad\qquad\qquad\quad$ *for* $244R_\theta^{0.318}$ *read* $338R_\theta^{0.42}$,
$\qquad\qquad\qquad\quad$ *for* $1.64(y^+)^{-0.5}R_\theta^{0.159}$ *read* $1.93(y^+)^{-0.5}R_\theta^{0.21}$
Page 113, line −14, *for* 60–$70\nu/u_\tau$ *read* 100–$130\nu/u_\tau$
Pages 117 and 119, *for* $R_\theta^{0.16}$ *read* $R_\theta^{0.21}$
Page 122, line 27, *for* $0.2C_y$ *read* $0.1C_y$
$\qquad\qquad$ line 31, *for* $3.28(y/C_y)^{0.37}$ *read* $2.25(y/C_y)^{0.34}$
Page 123, line −8, *for* $1.69(y/C_y)^{1.13}$ *read* $0.96(y/C_y)^{1.10}$
Page 125, line 6, *for* $5.2R_*^{0.151}(y^+)^{0.13}$ *read* $0.12R_*^{0.21}(y^+)^{0.10}$
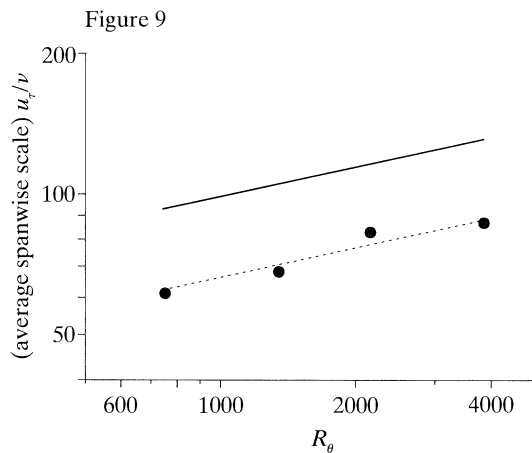
R. E. Falco

Figure 9

Figure 9. The typical eddy scales, C_y, ——, and the spanwise pocket scales, ●, non-dimensionalized using wall variables. A dashed line, parallel to the typical eddy curve fit, has been put through the pocket data for reference.
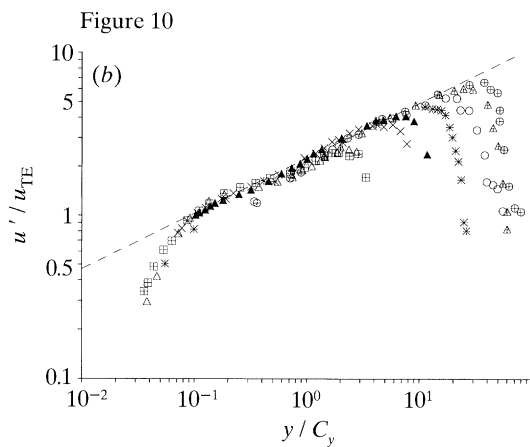
Figure 10

Figure 11

Figure 10b. The r.m.s. streamwise fluctuation (u') distributions over a wide range of Reynolds numbers, normalized using u_{TE} and C_y.
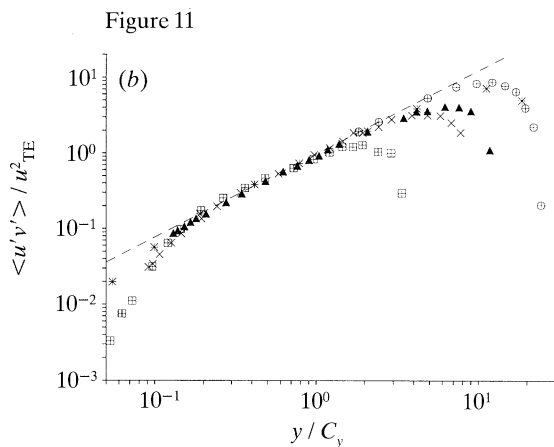
Figure 11b. The Reynolds stress $\langle u'v' \rangle$ distribution over a factor of 15 in Reynolds number, normalized using u_{TE}^2 and C_y.