ADDENDUM

Further Remarks on Similar Solutions for Laminar Boundary Layers [1][1]

B. S. Massey[2] and B. R. Clayton[2]

The treatment of displacement-thickness effects in references [1] and [2] can be improved by defining the dimensionless stream function f in terms of U_m rather than U_0, where U_m represents the velocity which would be found at the boundary if the main-stream velocity distribution were extrapolated to the boundary. Iteration procedures are not required, and the full lines in the figures of [1] and [2] account for displacement effects if U_m supplants U_0.

Displacement thickness, δ, and momentum thickness, θ, should be defined by

$$\delta = K^{-1}\left[\exp\left\{K\int_0^\infty (a^{-1} - u/U_m)dn\right\} - 1\right]$$

$$\theta(1 + K\theta)^{-1} \simeq \int_0^\infty (u/U_m)\{a^{-1} - u/U_m\}dn$$

where $a = 1 + Kn$. Modifications to values of δ in [1] are slight, but θ is more seriously affected. Fuller details are given in [3] and [4].

[1] Numbers in brackets designate References at end of Addendum.

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References

1 Massey, B. S., and Clayton, B. R., "Laminar Boundary Layers and Their Separation From Curved Surfaces," Journal of Basic Engineering, Trans. ASME, Series D, Vol. 87, No. 2, June 1965, pp. 483–494.

2 Massey, B. S., and Clayton, B. R., "Some Properties of Laminar Boundary Layers on Curved Surfaces," Journal of Basic Engineering, Trans. ASME, Series D, Vol. 90, No. 2, June 1968, pp. 301–312 and Vol. 90, No. 3, Sept. 1968, p. 430.

3 Clayton, B. R., and Massey, B. S., "Laminar Boundary Layers on Curved Surfaces," Report No. 1/71, Mechanical Engineering Department, University College London, England.

4 Massey, B. S., and Clayton, B. R., "Similar Solutions for Laminar Boundary Layers," to be published.