

### Problem 250A

If we assume that the velocity profile in a laminar boundary layer on a flat plate (zero pressure gradient) is of the approximate form

$$\frac{u}{U} = \sin \frac{\pi y}{2\delta} \quad \text{for } 0 < y < \delta$$

( and  $u/U = 1$  for  $y > \delta$  ) then find the resulting expressions for the displacement thickness,  $\delta_D$ , the momentum thickness,  $\delta_M$ , and the skin friction drag on the plate ( length =  $L$  , breadth =  $B$  ). Compare and comment on the comparison of these results with those of the exact Blasius solution.