1.1. Calculate the Reynolds number based on length for a 1.0-m flat plate in an airstream at sea level at 25°C with a velocity of 3 m/s. Then calculate the Reynolds number based on diameter for water at 25°C flowing at 150 cm^3/s through a tube of diameter 1.0 cm.

1.12. Consider the laminar flow near a flat, solid wall, as illustrated in Fig. 2.1. The momentum equation for this flow involves the competition among three effects: inertia, pressure gradient, and friction [see eq. (2.26)]. For the purpose of scale analysis, consider a flow region of length L and thickness L. Show that in this region, the ratio of inertia to friction is of order Re_L, where Re_L is the Reynolds number based on wall length. Note that the region selected for analysis is not the boundary layer region discussed in Chapter 2. In a certain flow, the value of Re_L is 10^3. What force balance rules the $L \times L$ region: inertia ~ pressure, inertia ~ friction, or pressure ~ friction?

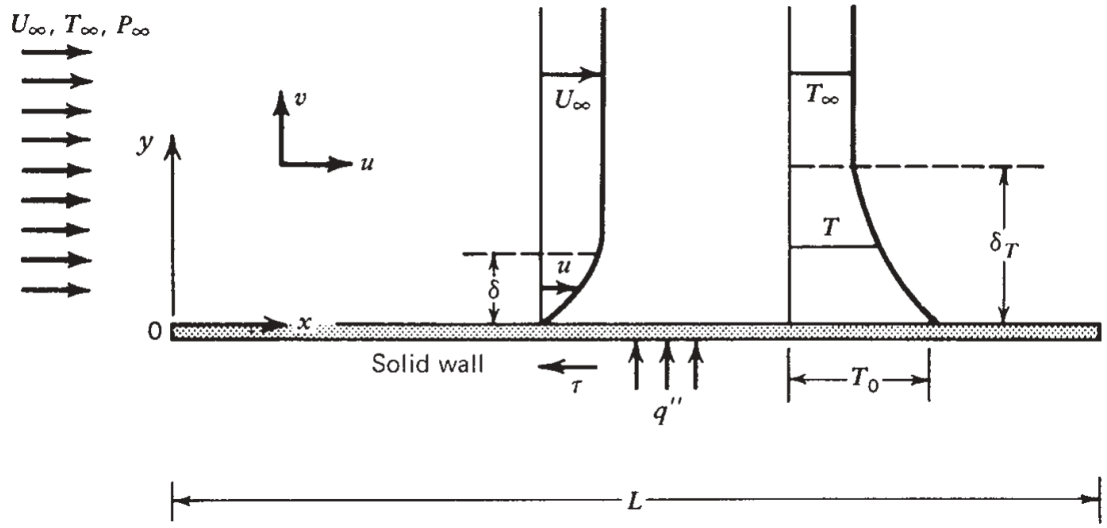

Figure 2.1 Velocity and temperature boundary layers near a plate parallel to a uniform flow.

1- با استفاده از آنالیز مقیاسی مرتبه ضخامت لایه مرزی را در جریان روی صفحه تخت در جریان آرام بدست آورید.