

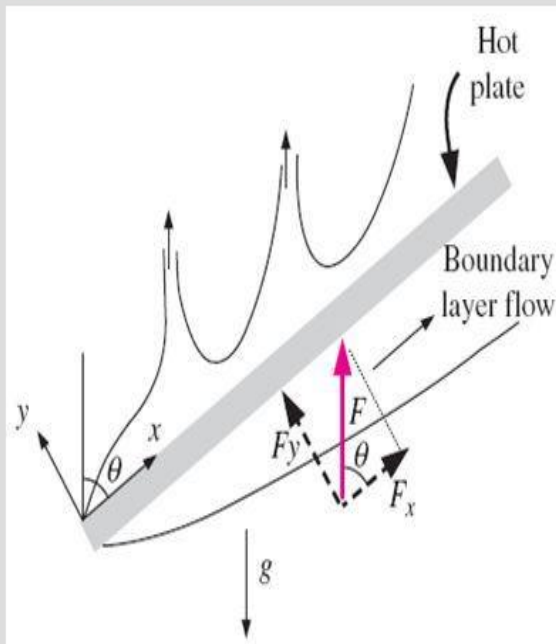


## Vertical Plates ( $q_s = \text{constant}$ )

The relations for isothermal plates in the table can also be used for plates subjected to uniform heat flux, provided that the plate midpoint temperature  $T_{L/2}$  is used for  $T_s$  in the evaluation of the film temperature, Rayleigh number, and the Nusselt number.

$$\text{Nu} = \frac{hL}{k} = \frac{\dot{q}_s L}{k(T_{L/2} - T_\infty)} \quad \dot{Q} = \dot{q}_s A_s$$

## Inclined Plates



Natural convection flows on the upper and lower surfaces of an inclined hot plate.

In a hot plate in a cooler environment for the lower surface of a hot plate, the convection currents are weaker, and the rate of heat transfer is lower relative to the vertical plate case.

On the upper surface of a hot plate, the thickness of the boundary layer and thus the resistance to heat transfer decreases, and the rate of heat transfer increases relative to the vertical orientation.

In the case of a cold plate in a warmer environment, the opposite occurs.