Heat Transfer

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Practical Lecture 3

6. Consider heat conduction on a rectangular plate in steady-state, the length (z direction) being infinite.. The surface $x = 0$ is electrically heated with a heat flux q''_0 [$\mathrm{W\,m^{-2}}$]. The surface $x = a$ is maintained at a constant temperature T_0. The surface $y = b$ is insulated. The surface $y = 0$ dissipates heat by convection to a medium at temperature T_∞ with a convection coefficient h. The thermal conductivity of the material is uniform and there is no internal generation of energy. Formulate the heat conduction problem, establishing the equation governing temperature distribution on the plate along with the associated boundary conditions.

9. Consider a truncated cone as shown in the figure. The coordinates x_0 and x_1 indicate the positions of the faces where the cone was truncated relatively to the apex of the cone. Consider that the lateral surface is insulated and the temperature in each section $x =$ constant is uniform. In the larger face, the temperature T_1 is known and, in the smaller face, the heat flux q''_0 is imposed. Determine the temperature distribution along x.