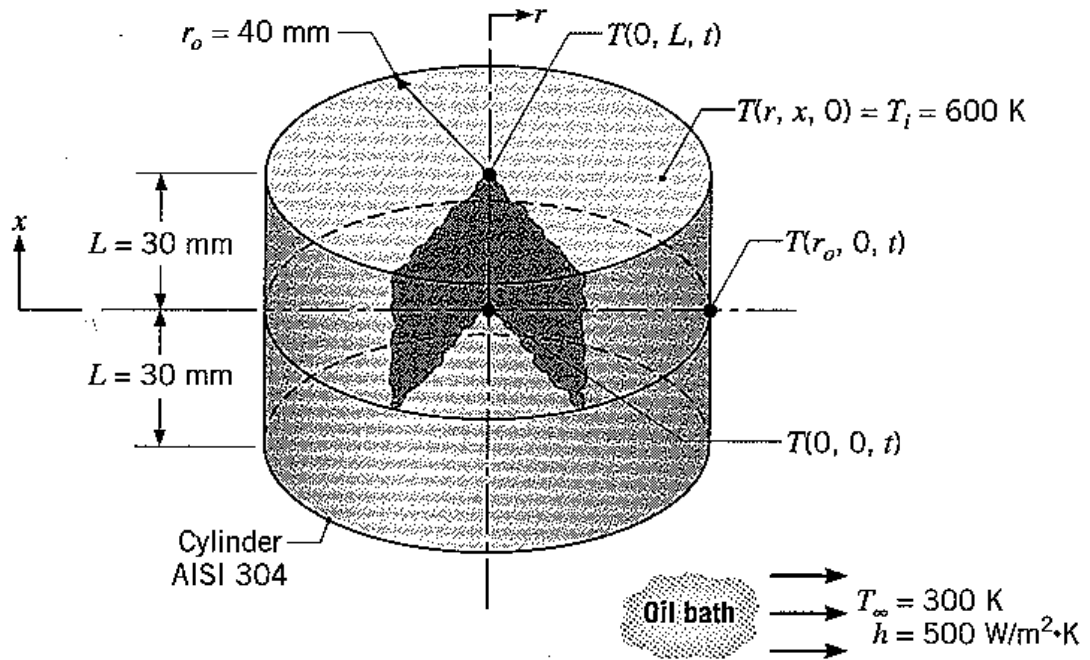


MAE 3314: Heat Transfer
Homework #5 (Due date – 10/23/07)

1. In a manufacturing process stainless steel cylinders (AISI 304) initially at 600K are quenched by submersion in an oil bath maintained at 300K with $h=500\text{W/m}^2\cdot\text{K}$. Each cylinder is of length $2L=60\text{mm}$ and diameter $D=80\text{mm}$. Consider a time 3min into the cooling process and determine temperatures at the center of the cylinder ($T(0, 0, t)$), at the center of a circular face ($T(0, L, t)$), and at the mid-height of the side ($T(r_o, 0, t)$). (10 pts)



2. Textbook 5.87 (10 pts)
 (Assume that (i) frozen ground beef has properties of ice, (ii) Radiation and convection to environment are negligible, (iii) packaging material has negligible heat capacity.)