Homework 4 Due: 05/18/2015

Applied Transport Phenomena - CHME420

Exercise 1. BSL 10B.2 This is similar to the example shown in class.

Exercise 2. BSL 10B.3 We started this in class.

Exercise 3. Obtain the average temperature and the flow average temperature for the profiles given in Equations 10B.9-2 and 10B.9-3.

Exercise 4. BSL 10B.12 Read problem carefully. State under which conditions you may postulate that $T = T(\theta)$ only. Make that postulate to solve the problem.

Exercise 5. Source: Middleman. Derive the differential equation (do not attempt to solve it) for the steady temperature profile in a circumferential rectangular fin as shown in Figure 1. Assume that the temperature at the base of the fin (r_1) is T_1 and that convective losses occur to the ambient medium at temperature T_a. Give sufficient boundary conditions to solve the problem. Make sure to specify your coordinate system.

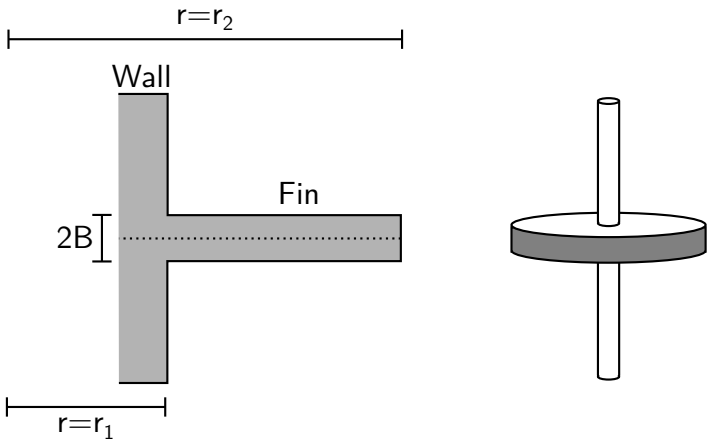

Figure 1: Circumferential fin around a rod.