HOMEWORK ME-504: Spring 2012

Problems in parenthesis are not required if you are taking the ME-404 section

Homework 1: due Thursday January 26

Problems 3.1, (3.5), 3.6, 3.7, 3.8

Homework 2: Due Tuesday February 7

1. For Eq. (3.6) with boundary conditions $-k\left.\frac{dT}{dx}\right|_{x=0} = q$ and $-k\left.\frac{dT}{dx}\right|_{x=L} = h_c(T - T_a)$, where h_c is the convective heat transfer coefficient and T_a is the ambient temperature. Use integration by parts to derive the weak weighted residuals formulation.
2. Problems 3.12, 3.16, 3.17

Homework 3: Due Thursday February 16

1. Use four linear elements to find an approximate solution to the equation

$$-\frac{d^2u}{dx^2} + u = 1, \quad u(0) = 1, \quad -\left.\frac{du}{dx}\right|_{x=1} = u(1) - 10$$

Compare your solution to the analytical solution.

2. Use three linear elements to find an approximate solution to the equation

$$-\frac{d}{dx}\left((1+x)\frac{du}{dx}\right) + \frac{1}{2}u = 4 - x^2, \quad u(1) = u(2) = 1$$

Homework 4: Due Thursday March 1

Problems 3.23, 3.28, 3.33 and 3.40. In problem 3.40 the boundary x = 1 is a Γ_1 boundary, this problem can be done by hand.

Homework 5: Due Thursday April 12

Problems 7.1, 7.2, 7.14 and 7.22