

ME5339
HOMEWORK SET NO. 4

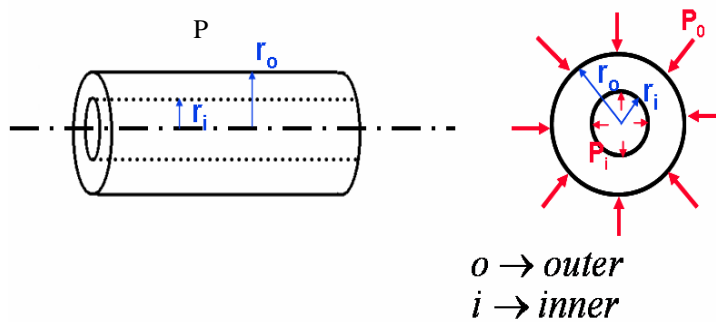
Due Feb. 26, 2008

Two Problems will be graded.

Problem 4-1

A pipe with hollow circular cross-section as shown subjected to the inner pressure, P_i and the outer pressure, P_o ,

- a) Determine the Airy Stress function by using polar coordinate system
- b) Solve all of the coefficients of the function
- b) Find the stress components at any point in the pipe.



Problem 4-2

A long beam whose nonhomogeneous cross-section is made of an aluminum channel section, $E_2=E_0=10 \times 10^6$ psi, and a titanium cover plate, $E_1=16 \times 10^6$ psi is shown in the figure below. The Y- and Z- axes are located at the centroid along the horizontal and vertical directions, respectively. If $M_y=200$ in-lbs and $M_z=50$ in-lbs, Determine:

- a) Centroid of the section
- b) Equivalent of moment of inertia based on Aluminum.
- c) Maximum bending stress and at what location

Note that $a=12t$ and $t=0.04$ inch.

