University of Massachusetts, Amherst  
CEE/MIE 630: Advanced Solid Mechanics

HW 02: Due Sept. 29 at the beginning of class

Graded:

**Problem 1:** Consider the solid shown below that is loaded by a uniform pressure $p$ and is fully constrained between the frictionless walls as shown:

(a) Write down the traction and displacement boundary conditions.

(b) Compute the stress and strain components for the case of plane strain.

(c) Compute the total volume change.

Ungraded:

**Problem 2:** Repeat problem 1 for the case of plane stress

**Problem 3:** A recent computer simulation yielded the following engineering stress/strain data points for a simulated uniaxial tension test on a steel foam material I am working on: $\sigma = [0 \ 11 \ 15 \ 19 \ 23 \ 28] \text{MPa}, \ \varepsilon = [0 \ 1 \ 9 \ 49 \ 99 \ 199] \times 10^{-3}$. Calculate the true stress and strain, and plot the engineering and true values on the same set of axes. Comment on your results.