CE 621 **PLASTIC ANALYSIS** Spring 2009

Homework #2

Assigned on Tuesday, Jan 20; due on Tuesday, Jan 27

Write a computer code for obtaining the moment-curvature (M-ϕ) relation for the rectangular reinforced concrete section with a single layer of reinforcement, whose dimensions are provided later. The stress-strain relation of concrete (f_c-ϵ_c) is provided in **Figure 1**. Assume a characteristic strength $f_c' = 5000$ **psi**, and a yield strain, $\epsilon_0 = 0.002$. Assume an elastic-plastic stress-strain behavior for the steel rebars, with $f_y = 55000$ **psi** and $E_s = 29000$ **ksi**.

Dimensions of the section: width (b) = **7 in**, overall depth (D) = **12 in**, depth of reinforcements (d) = **10.5 in**, and area of rebars (A_s) = **6 in^2**.

You can write your code in any programing language (C, Fortran), mathematical programing language (Matlab), or spreadsheet (Excel, Gnumeric, OpenOffice). Provide the formulas if you are submitting a spreadsheet program.

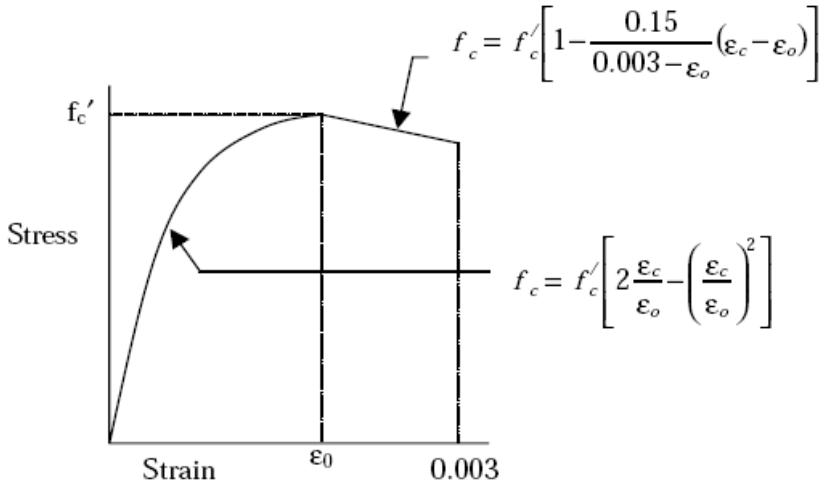

Figure 1. Stress-strain relation of concrete