HW#10 **ME 4210** **Due Date: Friday, December 4, 2015**

1. Write a MATLAB function having

As inputs

- The stiffness matrix of a laminate ($E = \begin{bmatrix} A & B \\ B & D \end{bmatrix}$)
- The in-plane resultants, the bending and torsion moments ($[N_x \quad N_y \quad N_{xy} \quad M_X \quad M_y \quad M_{xy}]^T$)
- Elastic Properties
- Stacking Sequence

As outputs

- The inverted stiffness matrix
- The midplane strains and curvatures
- The strains in the principal material directions in each layer
- The stresses in the principal material directions in each layer

2. Apply your code to the laminate with the given properties, stacking sequence and loading conditions

- Elastic Properties: $E_1 = 138$ GPa $E_2 = 9$ GPa $G_{12} = 6.9$ GPa $v_{12} = 0.32$
- Stacking sequence: [30/-60/-30/60]
- Lamina thickness $t = 1$ mm
- Loadings:

$N_X = 2.5$ kN/mm $N_y = 1.5$ kN/mm $N_{xy} = 1$ kN/mm
$M_x = 20$ Nm/mm $M_y = 15$ Nm/mm $M_{xy} = 10$ Nm/mm

- To find the laminate stiffness matrix, use the code you developed for HW#9.