

AOE 3024: Thin Walled Structures
Homework # 3: Due Wednesday, September 19, 2001

NAME

PLEDGE

a. Determine whether the following state of plane stress within an elastic solid is admissible. Note that A is constant. (10pts)

$$\sigma_{xx} = 2Ax^2 \quad (1a)$$

$$\sigma_{yy} = 2A(4x^2 + y^2) \quad (1b)$$

$$\tau_{xy} = -4Axy \quad (1c)$$

$$\tau_{yx} = \tau_{xy} \quad (1d)$$

$$\tau_{xz} = \tau_{yz} = \tau_{zx} = \tau_{zy} = 0 \quad (1e)$$

b. An element in plane stress at the surface of a wing panel is subjected to the following stresses

$$[\sigma] = \begin{bmatrix} 15 & -4 & 0 \\ -4 & -5 & 0 \\ 0 & 0 & 0 \end{bmatrix} \text{ MPa} \quad (2)$$

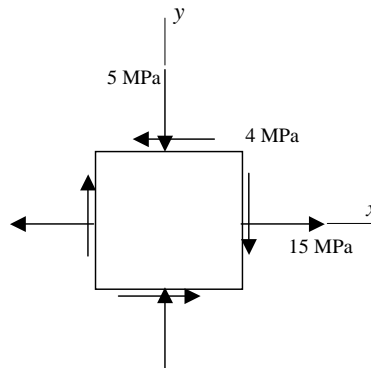


Fig. 1

Considering only the in-plane stresses and using Mohr Circle determine:

1. Stresses acting on a element inclined at an angle $\theta = 40^\circ$. (10pts)
2. Principal stresses and maximum shear stresses. (10pts)

(Show all results on sketches of properly oriented elements)