

1. Given a displacement field such that

$$a) u = c(x+2y), v = -c(2x+y), w = -cz$$

$$b) u = 2Lc \ln(1 + x/L), v = Lc \exp(-x/L), w = 0$$

Find the associated strains

2. Given a body in a state of plane strain given by:

$$a) \epsilon_x = \frac{AY^2}{L^2} + \frac{CXY}{L^2}, \epsilon_y = \frac{A(X^2+Y^2)}{L^2}, \gamma_{xy} = \frac{CXY}{L^2}$$

$$b) \epsilon_x = 3A \cos\left(\frac{\pi X}{L}\right) \sin\left(\frac{2\pi Y}{L}\right), \epsilon_y = C \cos\left(\frac{\pi X}{L}\right) \sin\left(\frac{2\pi Y}{L}\right), \\ \gamma_{xy} = 2A \sin\left(\frac{\pi X}{L}\right) \cos\left(\frac{2\pi Y}{L}\right)$$

$$c) \epsilon_x = \frac{A \cos(\pi Y/L)}{\left(1 + \frac{\pi X}{L}\right)^2}, \epsilon_y = B \exp\left(-\frac{\pi X}{L}\right) \cos\left(\frac{\pi Y}{L}\right)$$

$$\gamma_{xy} = A \exp\left(-\frac{\pi X}{L}\right) \sin\left(\frac{\pi Y}{L}\right) + \left[\frac{C}{\left(1 + \frac{\pi X}{L}\right)}\right] \sin\left(\frac{\pi Y}{L}\right)$$