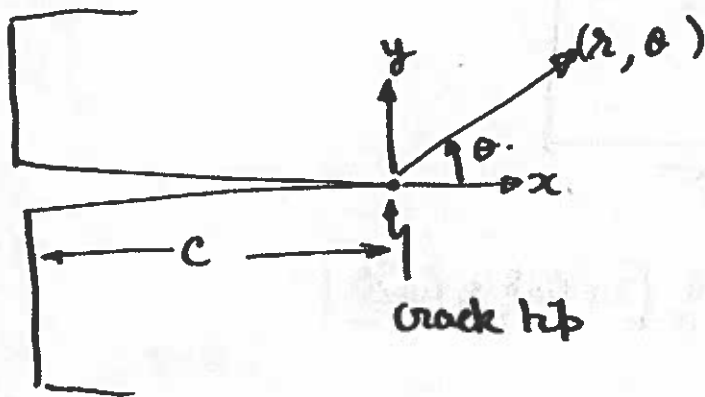


# Summary of Mode I Crack Stress Field



↑ ↑ ↑  
σ

$$K_I = \sigma \sqrt{\pi c}$$

Plane Strain  
↓

$$\sigma_{xx} = \frac{K_I}{\sqrt{2\pi r}} \cos \frac{\theta}{2} \left(1 - \sin \frac{\theta}{2} \sin \frac{3\theta}{2}\right)$$

$$\sigma_{yy} = \frac{K_I}{\sqrt{2\pi r}} \cos \frac{\theta}{2} \left(1 + \sin \frac{\theta}{2} \sin \frac{3\theta}{2}\right)$$

$$\sigma_{xy} = \frac{K_I}{\sqrt{2\pi r}} \sin \frac{\theta}{2} \cos \frac{\theta}{2} \cos \frac{3\theta}{2}$$

$$\sigma_{zz} = \nu(\sigma_{xx} + \sigma_{yy}) \text{ for plane strain}$$

$$u_x = \frac{K_I}{G} \sqrt{\frac{2}{2\pi r}} \cos \frac{\theta}{2} \left(1 - 2\nu + \sin^2 \frac{\theta}{2}\right)$$

$$u_y = \frac{K_I}{G} \sqrt{\frac{2}{2\pi r}} \sin \frac{\theta}{2} \left(2 - 2\nu - \cos^2 \frac{\theta}{2}\right)$$

$$u_z = 0$$

Plane Stress

$$\sigma_{zz} = 0$$

$$\nu \rightarrow \frac{\nu}{1+\nu}$$

$$E \rightarrow E \frac{(1+\nu)}{(1+\nu)^2}$$

$K_I$  unchanged