MLL251 (8:30-10) everytime.

Minor: 30
Major: 60
Quiz: 10
} can be flexible.

grade -1 if attendence < 75%

→ Elasticity Theory
↳ Plasticity in materials
↳ Single crystal deformation
↳ Dislocation theory.
↳ Strengthening Mechanisms
↳ Fracture.

Mechanical Behaviour of Materials:

→ The Last Breath: some movie

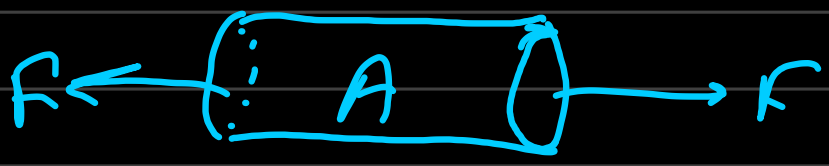
Stresses:

→ force per unit area.

↳ measure of the internal forces as a response to external reaction forces.

∴ σ_n → normal stress.

σ_t → shear stress.



get stretched differently

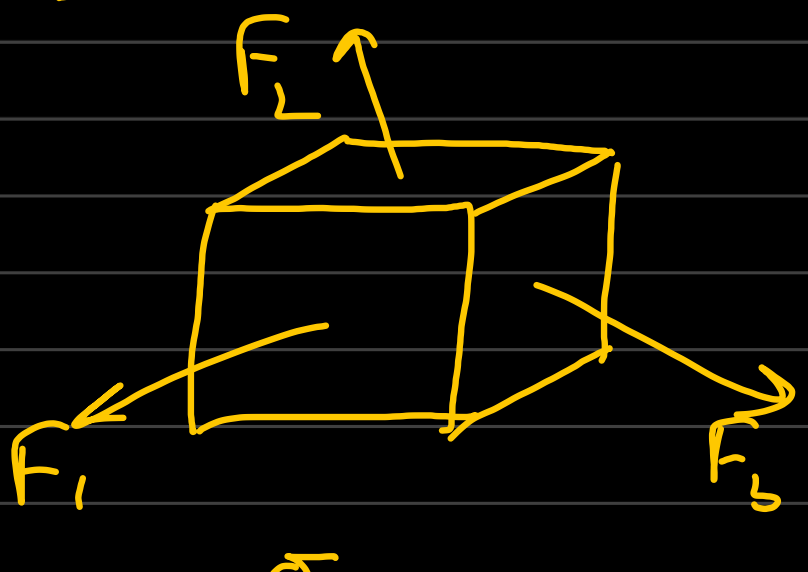
∴ More strength less stretch.

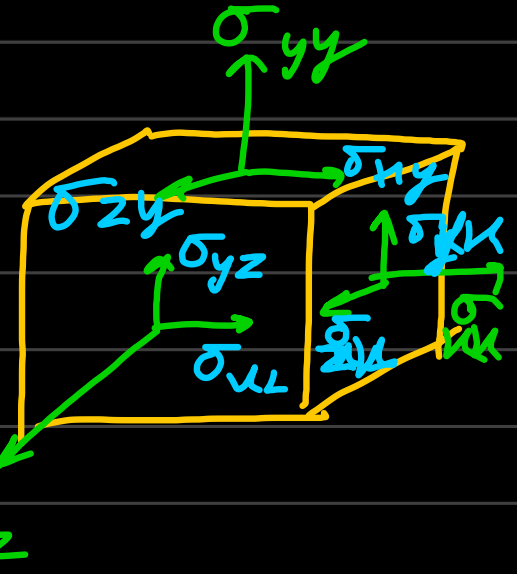
→ numerous acting planes at a pt. P.

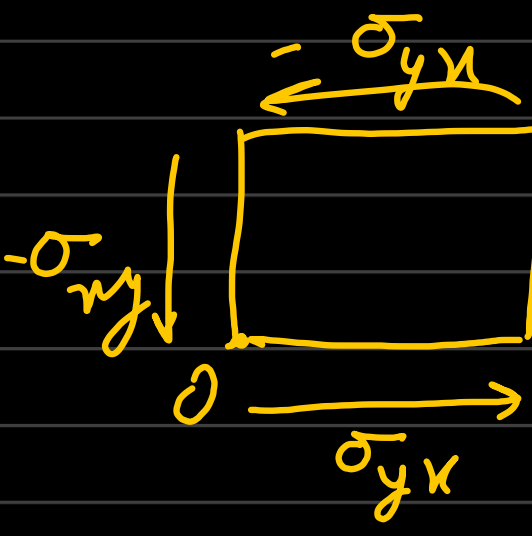
Equilibrium equations:

i) Translational: $\Sigma F_x = 0$; $\Sigma F_y = 0$; $\Sigma F_z = 0$

→ Stress Tensor:







Moment (abt O)

$$(\sigma_{xy}\Delta y)\Delta x - (\sigma_{yx}\Delta x)\Delta y$$

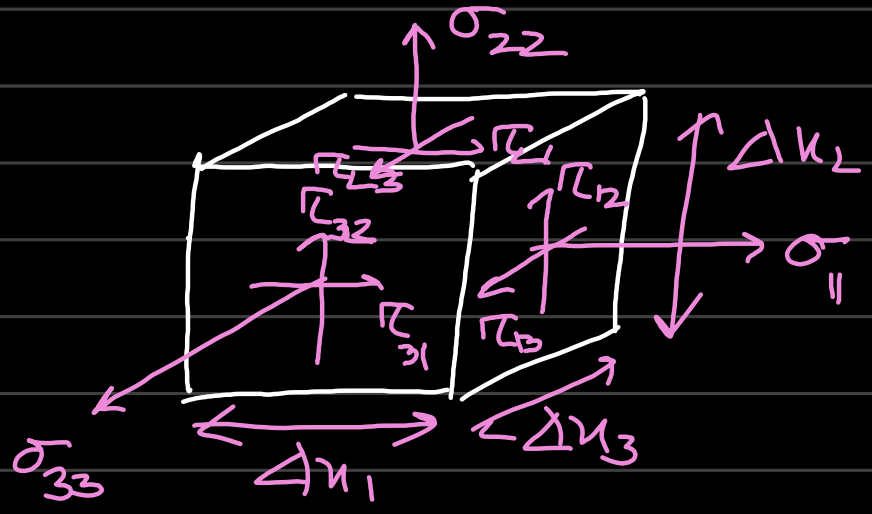
$$\therefore \sigma_{xy} = \sigma_{yx}$$

∴ We have 6 independent components.

$$\underline{\underline{\sigma}} = \begin{bmatrix} \sigma_{xx} & \sigma_{xy} & \sigma_{xz} \\ \sigma_{xy} & \sigma_{yy} & \sigma_{yz} \\ \sigma_{xz} & \sigma_{zy} & \sigma_{zz} \end{bmatrix}$$

2nd order tensor:

Equilibrium Equations:



$$\tau_{13} = \tau_{31} \; ; \; \tau_{12} = \tau_{21} \; ; \; \tau_{23} = \tau_{32}$$

Stress - Equilibrium Equations:

$$\frac{\partial \sigma_{11}}{\partial x_1} + \frac{\partial \tau_{21}}{\partial x_2} + \frac{\partial \tau_{31}}{\partial x_3} + \gamma_1 = 0$$

$$\frac{\partial \tau_{12}}{\partial x_1} + \frac{\partial \sigma_{22}}{\partial x_2} + \frac{\partial \tau_{32}}{\partial x_3} + \gamma_2 = 0$$

$$\frac{\partial \tau_{13}}{\partial x_1} + \frac{\partial \tau_{23}}{\partial x_2} \quad \frac{\partial \sigma_{33}}{\partial x_3} + \gamma_3 = 0$$

In indicial notation:

$$\sum_{i=1}^{3} \frac{\partial \underline{\underline{\sigma}}}{\partial x_i} \underline{e}_i + \underline{\gamma} = \underline{0}$$ Force eqn

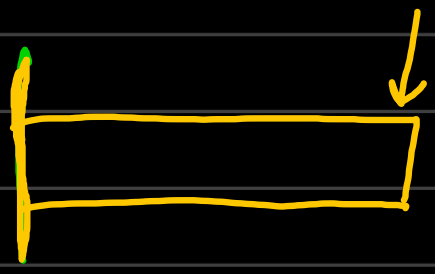
$$\underline{\underline{\sigma}} = \underline{\underline{\sigma}}^T$$ Moment eqn.

$$\left[\underline{\underline{\sigma}}\right]_{(e_1 - e_3)} = \begin{bmatrix} \sigma_{11} & \tau_{12} & \tau_{13} \\ \tau_{21} & \sigma_{22} & \tau_{23} \\ \tau_{31} & \tau_{32} & \sigma_{33} \end{bmatrix}$$

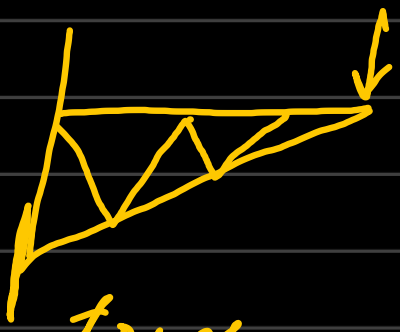
Hydrostatic & Deviatoric Stress:

$$\sigma_m = \frac{\sigma_x + \sigma_y}{2}$$

APL205
Basics of Computer Aided Design.
(2-0-0)



cantilever



truss

Concept → Analysis → Optimisation.
(FEM)

Model (2D/3D)
graphics

2D - transformation
3D - transformation.
Curves (2D/3D)
Surfaces
Solid Body

→ Mathematical course: Equations.

Mathematical Elements for Computer Graphics.

↳ Mc-Graw Hill : David Rogers, Alan Adams.

→ 40% Mid Sem
40% End Sem
} Pen paper with Calculator.

20% assignments

↳ all CAD to be made on MATLAB
↳ not on any commercial software.