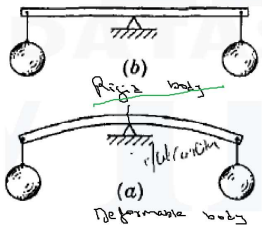
MECH2D
Lecture-5

4/12/2022

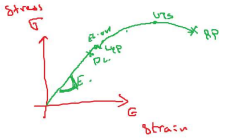
Rigid body : Rigid body is one for which all parts maintain the same positions relative to one another. work force



Deformable body: Is opposite of rigid body

Macroscopic Force displacement
Microscopic stress strain
$\sigma = f(\epsilon)$ ↳ function Constitutive law

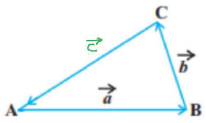
$\sigma = E\epsilon$ ↳ Young's modulus



Force : a) Vector : 3 components
b) magnitude & direction
c) point of application

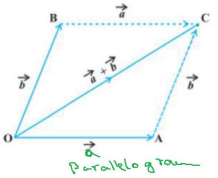
Vector algebra

$\underline{C} = \underline{a} + \underline{b}$
$AC = AB + BC$



Triangle law

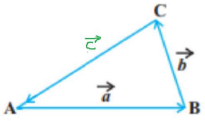
$AB + BC + CA = 0$
$AB + BC = -CA = AC$
$\underline{a} + \underline{b} = C = AC$



Parallelogram law

Equilibrium of Forces (static)

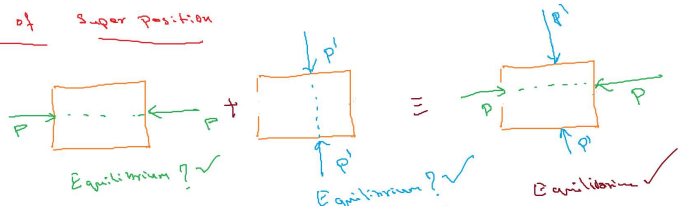
$\Sigma F = 0$
$\Sigma M = 0$
$\underline{a} + \underline{b} = 0$
Pnt C will coincide with pt A
$AB = -BC$ ① ② equal, opposite
$\underline{a} = -\underline{b}$ Collinear ③



Triangle law

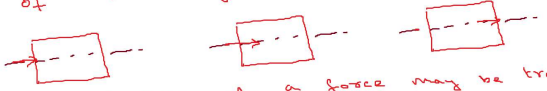
when M = 0
line AB :: same as line CD

Law of Super position



The action of a given system of forces on a rigid body will no way be change if we add or substract from them another system of forces in equilibrium

Law of Transmissibility:



Point of application of a force may be transmitted along its line of action without changing the effect of the force on rigid body