

Force system resultants

lect. #4

The moment of a force about a point or axis provides a measure of tendency of the force to cause a body to rotate about the point or axis.

$$(+) M_o = -F \cdot d$$

sign ↓ perpendicular
force (force Component) distance

Diagram showing a horizontal line representing an axis of rotation. A vertical line segment connects a point labeled 'O' to a force vector labeled 'F'. The distance between them is labeled 'd'. A right-angle symbol at the connection point indicates they are perpendicular.

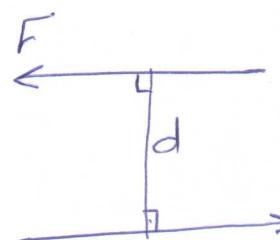
لورت القوة بالقطب
 $\therefore d=0 \therefore M=0$

resultant moment of a system

$$(+) M_{R_o} = \sum F \cdot d$$

Moment of a Couple

A Couple is defined as two parallel forces that have the same magnitude, have opposite directions, and are separated by a perpendicular distance d .



Equivalent Couples

لما هر جوافد مماثلة

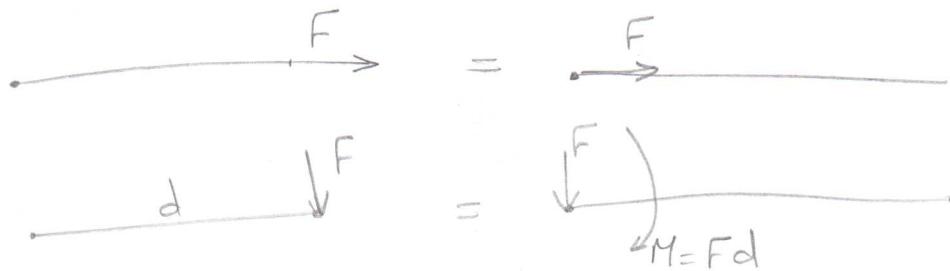
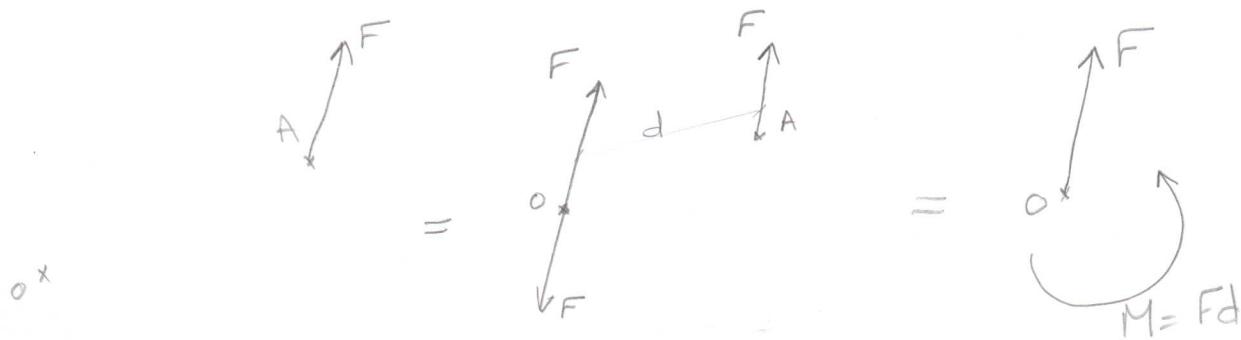
Resultant Couple Moment

$$M_R = M_1 + M_2$$

Force system resultant

* An equivalent system Lect # 5

The method used to simplify a system of forces and couple moments acting on a body to a single resultant force and couple moment acting at a specified point O.

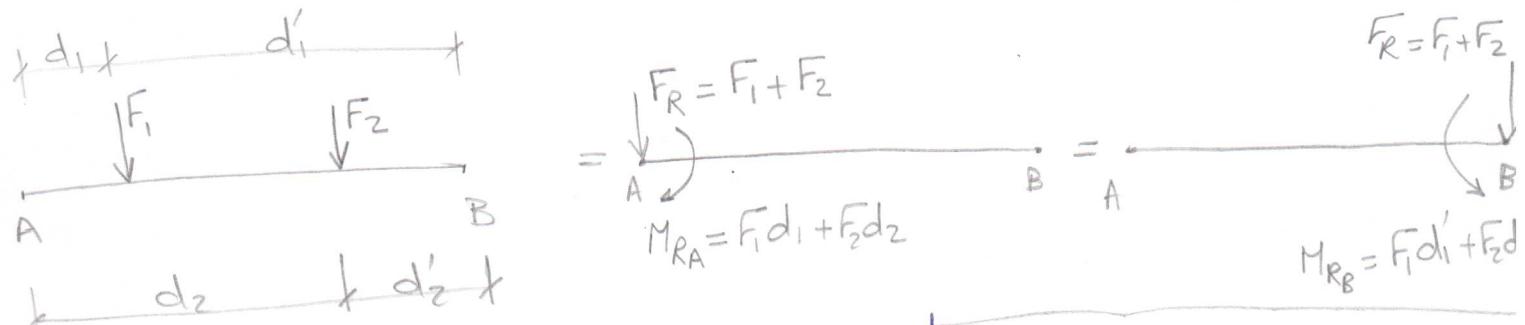


* Resultant of a force and couple system

$$F_{Rx} = \sum F_x$$

$$F_{Ry} = \sum F_y$$

$$M_{Ro} = \sum M_c + \sum M_o$$



* Further reduction of a force and couple system

