

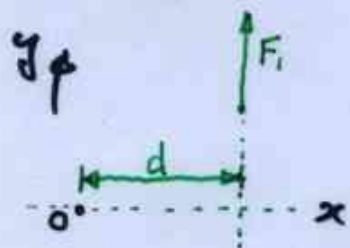
FORCE

b1

↳ LINEAR ACCELERATION $\vec{F} = m\vec{a}$

↳ ROTATION ABOUT AN AXIS MOMENT $\vec{M} = \vec{r} \times \vec{F}$

2-D simple: Axis is a point "o"



$$\vec{M}_o = +F_i d$$

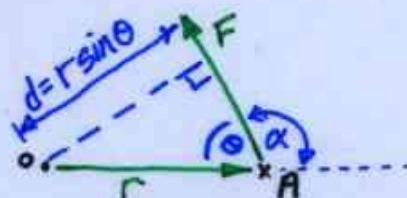
GET SIGN FROM
RIGHT HAND RULE



IN 2-D MOMENT EITHER "UP" OR "DOWN"
+ -

FOR 3-D CASE VECTOR APPROACH HELPS

$$\vec{M} = \vec{r} \times \vec{F} \quad (\text{Note order!})$$



if $\vec{r} = 2\hat{i}$ & $\vec{F} = -\hat{i} + 2\hat{j}$ then

$$\vec{M} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 0 & 0 \\ -1 & 2 & 0 \end{vmatrix} = \hat{i}(0) - \hat{j}(0) + \hat{k}(2 \cdot 2 + 1 \cdot 0)$$

DETERMINANT $= 4\hat{k}$



RIGHT HAND RULE CONFIRMS SIGN/DIRXN
CORRECT.

VARIGNON'S THEOREM

"THE MOMENT OF A FORCE ABOUT AN AXIS
IS EQUAL TO THE SUM OF THE MOMENTS
OF ITS COMPONENTS ABOUT THAT AXIS"