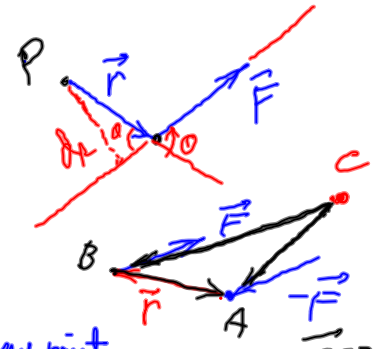
Moment of a force

Force: an action to cause a body to translate

Moment: " " " " " " " rotate

Moment center, moment arm, Varignon's theorem,

Right-hand rule for moments



$\boxed{\vec{M}_P = \vec{r} \times \vec{F}}$ $\quad M_P = r \cdot F \cdot \sin\theta$

$M_P = (r \sin\theta) F = d_\perp F$ $\quad \boxed{M_P = d_\perp F}$

Moment of a couple is the same about any point.

$\vec{CB} = \vec{CA} + \vec{AB}$

$\vec{CB} - \vec{CA} = \vec{AB}$

$\vec{M}_A = \vec{r} \times \vec{F} + \vec{0} = \vec{r} \times \vec{F}$ $\qquad \vec{M}_B = \vec{0} + \vec{BA} \times (-\vec{F})$

$\vec{M}_B = -\vec{BA} \times \vec{F} = \vec{AB} \times \vec{F} = \vec{r} \times \vec{F} = \vec{M}_A$, $\qquad \vec{M}_A = \vec{M}_B = \vec{M}_L = \vec{M}_S = \cdots$

Moment of a couple is a free vector.

$\vec{M}_C = \vec{CB} \times \vec{F} + \vec{CA} \times (-\vec{F}) = \vec{CB} \times \vec{F} - \vec{CA} \times \vec{F} = (\vec{CB} - \vec{CA}) \times \vec{F}$

$= \vec{AB} \times \vec{F} = \vec{M}_A = M_P = \cdots$