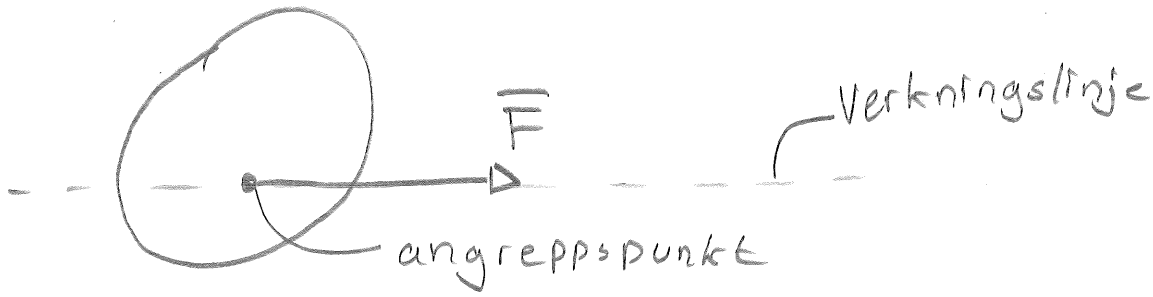
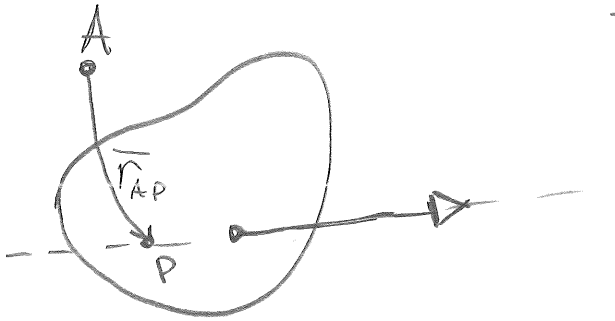
Föreläsning 5

KORT SAMMANFATTNING (kapitel 2)

Kraft: Beskriver kroppars växelverkan



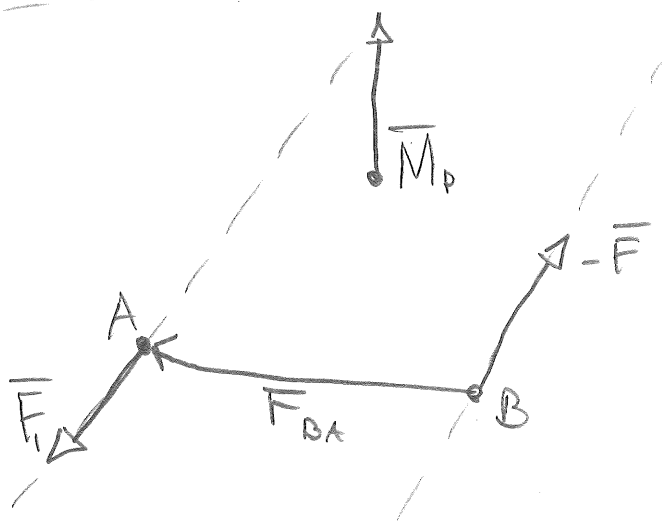
Moment: Beskriver vridande förmåga



$$\bar{M}_A = r_{AP} \times \bar{F}$$

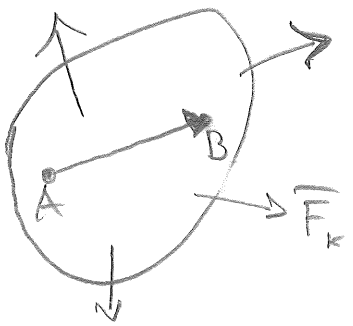
Kraftparsmoment:

$$M_P = r_{BA} \times \bar{F}_1 \equiv \bar{C}$$



$\bar{C}$ = "couple" Frivektor

Sambandsformeln:



$$M_A = M_B + \bar{r}_{AB} \times \sum_k \bar{F}_k$$

Vektor:

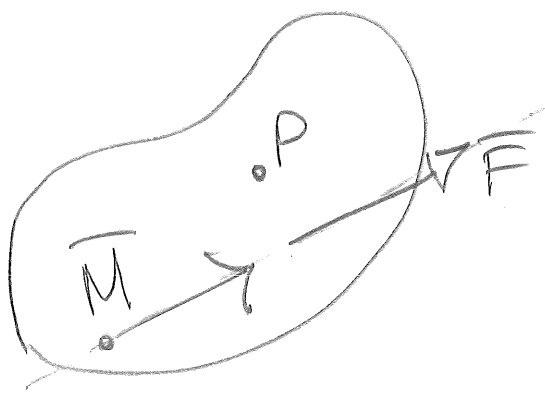
$$\bar{Q} = \underbrace{Q}_{\text{Belopp}} \cdot \underbrace{\bar{e}_Q}_{\text{enhetsvektor}} = Q_x \bar{e}_x + \underbrace{Q_y \bar{e}_y}_{\text{komponent}} + \underbrace{Q_z \bar{e}_z}_{\text{komponent}}$$

Projektionsformel:

$$Q_{\text{projektion}\bar{(AB)}} = \underbrace{(\bar{Q} \cdot \bar{e}_{AB})}_{\text{Storlek}} \underbrace{\bar{e}_{AB}}_{\text{Riktning}}$$

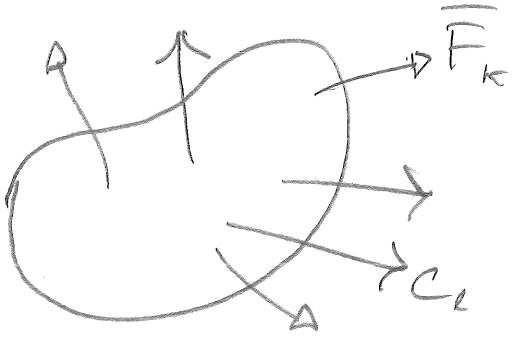
e_{AB}: Enhetsvektor i AB-riktningen

Kraftskruv:

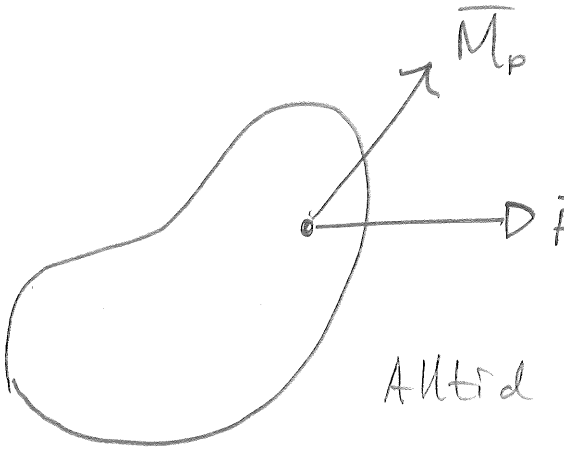


Alltid möjligt

Kraftsystem: (kraft + moment)

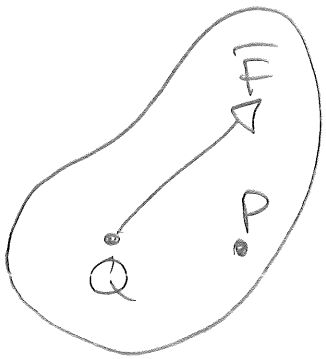


Resultant:



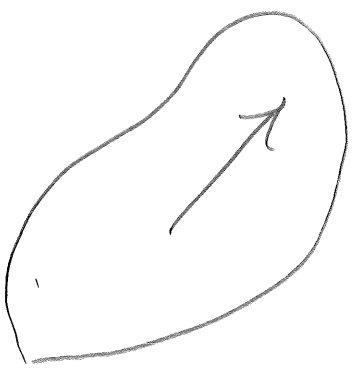
Alltid möjligt

Kraftresultant:



om $M_P \cdot \bar{F} = 0$

Kraftpars momentresultant



Om $\sum_k \bar{F}_k = \bar{F} = \bar{0}$

Jämvikt

$$\sum \bar{F} = m\bar{a}_G = \bar{0}$$

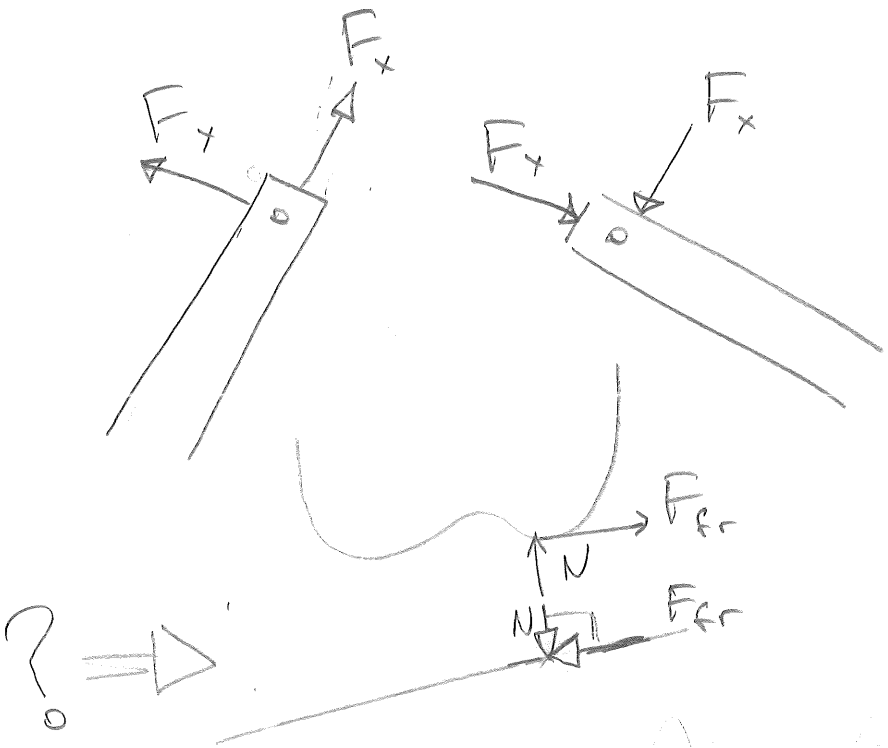
$$\sum M_G = \underline{\underline{I}}_G \alpha = 0$$

(redan skrivit detta)

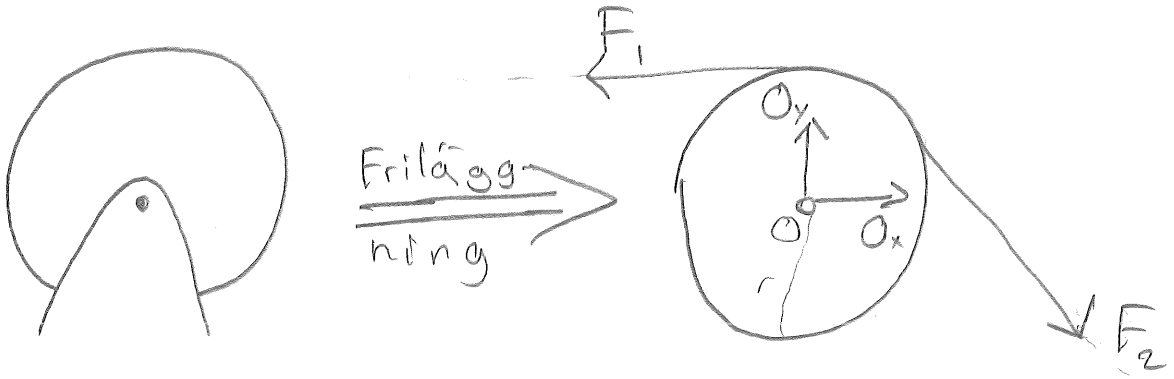
Fig s. 61 och s. 62!

VIKTIGT

Lagen om verkan och motverkan:



Trissa # s. 60!



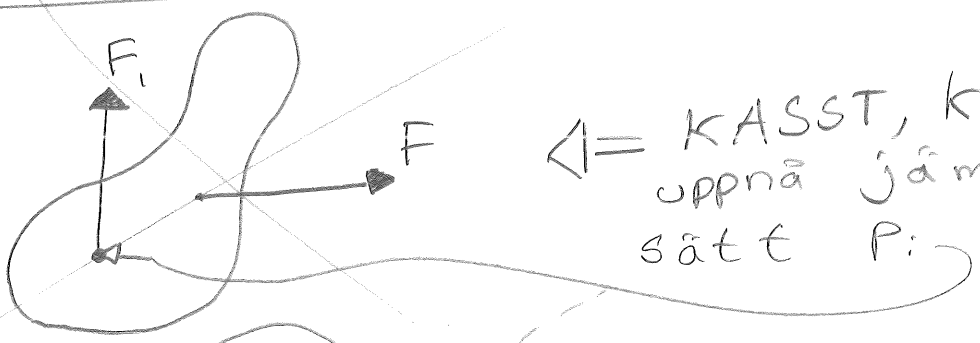
Jag vill ha jämvikt!

$$\sum \vec{M}_O = 0 \Rightarrow -F_1 \cdot r + F_2 \cdot r = 0$$

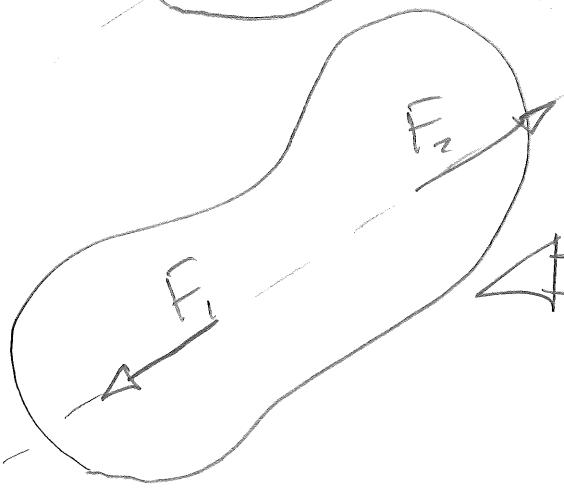
$$\Rightarrow \boxed{F_1 = F_2}$$

Glöm ej att ange med-/moturs ($\vec{M}_O$, $\vec{M}_O$)

Tvåkraftskropp # fig 2 s. 60



<= KASST, kan ej uppnå jämvikt. sätt P:



<= BRA, $F_1 = F_2$

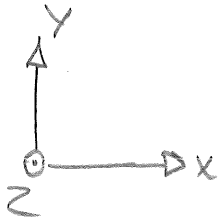
Kraftsumman = 0

Trekraftskropp

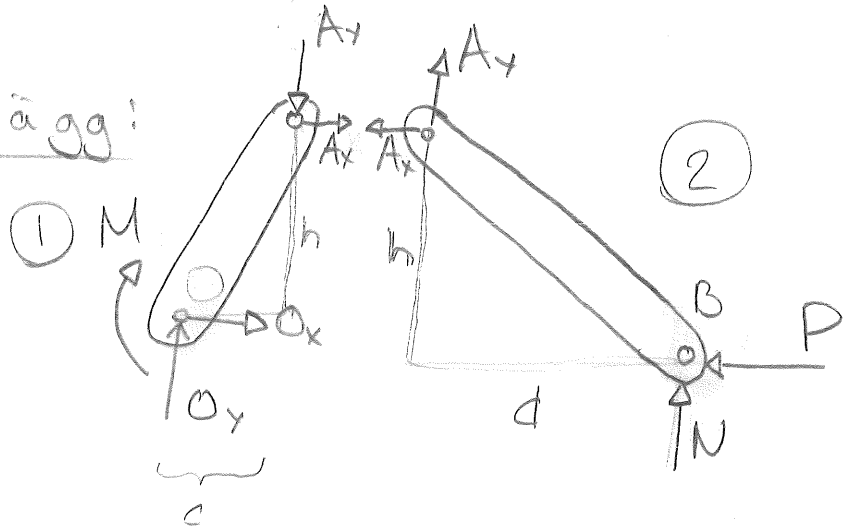
- Måste vara ett plant kraftsystem
- Krafterna måste vara antingen parallella eller ligga placerade så att verkningslinjerna har en gemensam punkt.

Exempel 3.5

s. 65



Friläggning:



$$\textcircled{1} \quad \sum F_x = A_x + O_x = 0$$

$$\sum F_y = O_y - A_y = 0$$

$$\sum M_0 = -M - A_x \cdot h - A_y \cdot c = 0$$

② $\sum F_x = -A_x - P = 0$

$\sum F_y = A_y + N = 0$

kan uttryckas i sin och cos.

$\sum M_B = A_x \cdot h - A_y \cdot d = 0$

Antal okända: $O_x, O_y, A_x, A_x, M, N + c, d, h$

Svar: $M = Pa \cdot \sin\theta \left[1 + \frac{a\cos\theta}{\sqrt{b^2 - a^2\sin^2\theta}}\right]$