Problemas sobre el teorema de Varignon

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en esta practica aprenderemos a calcular momentos a través de fuerzas y vectores

f1=(100-120j+75k)lb

f2=(-200i+250j+100k)lb

rA=(0i+0j+0k)

rB=(4i+5j+3k)

Mo= M1+M2=rAxF1+rBxF2

rA X F1= $|I \quad J \quad K|$

$|0 \quad 0 \quad 0|$ = 0i+0j+0k

$|100 \quad 120 \quad 75|$

rB X F2= $|I \quad J \quad K|$

$|4 \quad 5 \quad 3|$=(875-390)i-(700-(-300))j+(520-(-500))k

$|-100 \quad 130 \quad 175|$

MOT=485i-1000j+1020k

$FAX = FA\cos\theta = \frac{4}{5}FA$

$FAY = FA\sin\theta = \frac{3}{5}FAFBX = FB\cos\ \theta 60°$

$FAY = FB\sin\theta 60°$

$\Sigma Fx = 0$

$\Sigma Fbx - Fby = 0$

$-30lb\cos 60 - \frac{4}{5}FA = 0$

FA=$\frac{5}{4}$(-30lb cos60°) = 18.75

Este valor solo solo seria valido si las fuerzas estuvieran actuando con el mismo brazo.

para B

rbx= 6 ft

ray=0

Fax =30lb cos 60°

Fay=30lb sin 60°

Fbx=$\frac{4}{5}FA$

Fby=$\frac{3}{5}FA$

para A

rbx=9 ft

rby=0

MA=rax X Fay-ray X Fax

=$(9ft)\left(\frac{3}{5}FA\right) - (0)\left(\frac{4}{5}\right) = \frac{27}{5}FA\ lb\ ft$

rbx X Fby-rby X Fb=(6)(30sen60°)-(0)(30cos60°)=155.88lb ft

$\Sigma M = 0$

$Mb - Ma = 0$

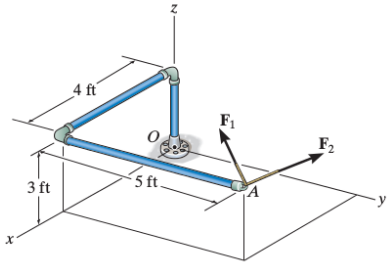
$155.88\ lb\ ft\ - \frac{27}{5}\ FA\ lb\ ft$

$\frac{27}{5}FA = 155.88$

$FA = \left(\frac{27}{5}\right)(155.88\ lb\ ft)$

$FA = 28.9\ lb\ ft$

F4–12. If $\mathbf{F}_1 = \{100\mathbf{i} - 120\mathbf{j} + 75\mathbf{k}\}$ lb and $\mathbf{F}_2 = \{-200\mathbf{i} + 250\mathbf{j} + 100\mathbf{k}\}$ lb, determine the resultant moment produced by these forces about point O. Express the result as a Cartesian vector.



4–14. Two boys push on the gate as shown. If the boy at B exerts a force of $F_B = 30$ lb, determine the magnitude of the force F_A the boy at A must exert in order to prevent the gate from turning. Neglect the thickness of the gate.