PROBLEMAS SOBRE EL TEOREMA DE VARIGNON

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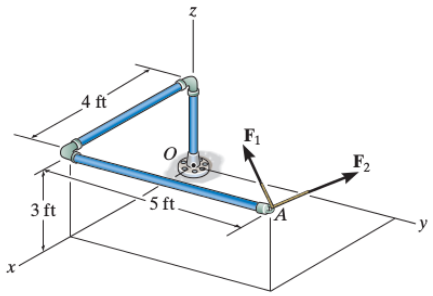
En esta practica siguiente se vera problemas sobre calcular los momentos que son a través de los vectores y las fuerzas.

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.



$f1 = (100 - 120j + 0k)\, lb \;\; f2 = (-200i + 250j + 100k)\, il$

$RA = (0i \;\; + 0j + 0k) \;\; RB = (4i + 5j + 3k)$

$Mo + M1 + M2 = rAxF1 + rBxF2$

rA X F1=

$|I \;\; J \;\; K|$

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

$|100 \;\; 120 \;\; 75 \;\; |$

rB X F2 =
$|I\ J\ K|$
$|4\ 300)\, j + (520 - (-500)\ \ k\ 53\ \ |=|$
$(875 - 390\ )\, i\ \ - (700 - (-)| - 100i\ 130j\ 1020k\,||$
MOT = 485i-1000j+1020k

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

$FAY = FA\ SIN\ \theta = \frac{3}{5}\ FAFBX = FB\ COS\ \theta 60$

$FAY = FB\ SIN\ 60$

$\Sigma Fbx = 0$

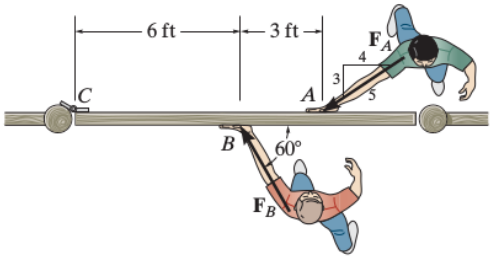
$\Sigma Fbx\ \ - fby = 0$

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

$FA = \frac{5}{5}\,(-30lb\ COS\ 60) =\ \ 18.75$ **resultado**

EJERCICIO 2

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.



PARA B

Fax =30lb cos 60°

rbx = 6 ft

ray =0

Fay= 30lb cos 60°

PARA A

rbx=9

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

ft rby=0

MA=rax X Fay - ray x Fax

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

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

rbx x Fby - rby x Fb= (6) (30 sin 60) (0) (30 cos 60)_= 155.88 lb ft

$\Sigma M\ =0$

$Mb-Ma=0155.88ls\ ft-\frac{27}{5}FA\ lb\ ft$

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

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

$FA=29.9\ lb\ ft\ respuesta$