Prova 3

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LUCAS LIMA

1) $\vec{AB} = (450\ ;\ 600\ ;\ 0)$

$\vec{AC} = (0\ ;\ 600\ ;\ -320)$

$$\cos\theta = \frac{AB \cdot AC}{|AB| \cdot |AC|} = \frac{360000}{750 \cdot 689} = 0{,}7058$$

$\theta = 45{,}1°$

2- $\vec{AD} = (-500\ ;\ 600\ ;\ 360)$

$\vec{AB} = (450\ ;\ 600\ ;\ 0)$

$$\cos\alpha = \frac{135000}{648000} = 0{,}209$$

$\alpha = 77{,}9°$

3) $\vec{AC} = (0\ ;\ 600\ ;\ -320)$

$\vec{AD} = (-500\ ;\ 600\ ;\ 360)$

$$\cos\beta = \frac{\vec{AC} \cdot \vec{AD}}{|AC| \cdot |AD|} = \frac{244800}{589800} = 0{,}418$$

$\beta = 65{,}3°$

4) $T = 450\ N$

$\vec{BH} = (0{,}875\,i + 0{,}75\,j) - (0{,}5\,i + 0{,}75\,k)$

$BH = 1{,}25\ m$

$\lambda BH\ (0{,}333\,i + 0{,}666\,j - 0{,}666\,k)$

$$\vec{T}_{BA} = (150i + 300j - 300k)$$

7) $$\begin{vmatrix} 0,8 & 0 & -0,6 \\ 0,15 & 0 & 0 \\ 150 & 300 & -300 \end{vmatrix} = -90 \text{ N·m}$$

8) $\Sigma F_x = -21$ N

9) $\Sigma F_y = -29$ N

10) $\Sigma F_z = -16$ N

11) $$M_1 = \begin{vmatrix} i & j & k \\ 0 & 0 & 0 \\ 0 & 0 & -16 \end{vmatrix} = 0$$

$\vec{CD} = (30i + 30j - 30k)$

$\vec{CB} = (20i + 110j - 30k)$

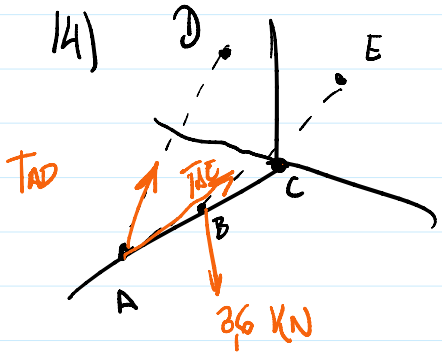
$$M_2 = \begin{vmatrix} i & j & k \\ 30 & 30 & -30 \\ -21 & 0 & 0 \end{vmatrix} = +630j + 630k \text{ N·m}$$

$$M_3 = \begin{vmatrix} i & j & k \\ 20 & 110 & -30 \\ 0 & -12 & 0 \end{vmatrix} = (-360i - 240k)$$

$M_R = (-870i + 630j + 390k)$

$$M_4 = \begin{vmatrix} i & j & k \\ 0 & 110 & -30 \\ 0 & -17 & 0 \end{vmatrix} = (510i)$$

14)



A = (0;0; 2,4)

B = (0;0; 1,2)

C = (0;0;0)

D = (-0,8; 0,6; 0)

E = (0,8; 1,2; 0)

$\overrightarrow{AD} = (-0{,}8;\ 0{,}6i - 2{,}4)$ $\quad |AD| = 2{,}6$ $\quad T_{AD} = |T_{AD}| \cdot \lambda_{AD}$

$\overrightarrow{AE} = (0{,}8\ i\ ;\ 1{,}2\ i - 2{,}4)$ $\quad |AE| = 2{,}8$ $\quad T_{AE} = |T_{AE}| \cdot \lambda_{AE}$

$\overrightarrow{AC} = (0\ i\ ;\ 0\ j ; -2{,}4)$ $\quad |AC| = 2{,}4$

$C = C_x i + C_y j + C_z k$

$\lambda_{AD} = (-0{,}308\, i + 0{,}231\, j - 0{,}923\, k)$

$F_B = (-3{,}6\, j)\ kN$

$\lambda_{\overrightarrow{AE}} = (0{,}286\, i + 0{,}429\, j - 0{,}857\, k)$

$\lambda_{\overrightarrow{AC}} = (0i + 0j - 1z)$

$T_{AD} = T \cdot \lambda_{AD}$ $\qquad T_{AE} = T \cdot \lambda_{AE}$