Ejercicios Estática

Ejercicio 1

$$\|\vec{P}\| = 1500lb \tag{1}$$

$$\|\vec{Q}\| = 660lb \tag{2}$$

$$\|\vec{P_{xz}}\| = \|\vec{P}\|cos30 \tag{3}$$

$$\|\vec{P_x}\| = -\|\vec{P}\|cos30sin15 \tag{4}$$

$$\|\vec{P_y}\| = \|\vec{P}\|sin30 \tag{5}$$

$$\|\vec{P_z}\| = \|\vec{P}\|cos30cos15 \tag{6}$$

$$\|\vec{Q_{xz}}\| = \|\vec{Q}\|cos40 \tag{7}$$

$$\|\vec{Q_x}\| = \|\vec{Q}\|cos40cos20 \tag{8}$$

$$\|\vec{Q_y}\| = \|\vec{Q}\|sin40 \tag{9}$$

$$\|\vec{Q_z}\| = -\|\vec{Q}\|cos40sin20 \tag{10}$$

$$\vec{R} = (-\|\vec{P}\|cos30sin15 + \|\vec{Q}\|cos40cos20)i + (\|\vec{P}\|sin30 + \|\vec{Q}\|sin40)j + (\|\vec{P}\|cos30cos15 - \|\vec{Q}\|cos40sin20)k \tag{11}$$

$$\vec{R} = 138.9i + 1174.2j + 1081.9k \tag{12}$$

$$\|\vec{R}\| = \sqrt{138.9^2 + 1174.2^2 + 1081.9^2} \tag{13}$$

$$\|\vec{R}\| = 1602.7lb \tag{14}$$

$$cos\Theta_x = \frac{\|\vec{R_x}\|}{\|\vec{R}\|}, cos\Theta_y = \frac{\|\vec{R_y}\|}{\|\vec{R}\|}, cos\Theta_z = \frac{\|\vec{R_z}\|}{\|\vec{R}\|} \tag{15}$$

$$\Theta_x = cos^{-1}\frac{\|\vec{R_x}\|}{\|\vec{R}\|}, \Theta_y = cos^{-1}\frac{\|\vec{R_y}\|}{\|\vec{R}\|}, \Theta_z = cos^{-1}\frac{\|\vec{R_z}\|}{\|\vec{R}\|} \tag{16}$$

$$\Theta_x = 85.0, \Theta_y = 42.9, \Theta_z = 47.5 \tag{17}$$

$$\tag{18}$$

Ejercicio 2

$$\vec{AC} = 240i + 720j - 130k \tag{19}$$
$$\vec{AB} = -480i + 720j - 160k \tag{20}$$
$$\vec{\lambda_{AC}} = 0.31i + 0.94j - 0.17k \tag{21}$$
$$\vec{\lambda_{AB}} = -0.55i + 0.82j - 0.18k \tag{22}$$
$$\vec{T_1} = T\vec{\lambda_{AB}} \tag{23}$$
$$\vec{T_1} = -0.55Ti + 0.82Tj - 0.18Tk \tag{24}$$
$$\vec{T_2} = T\vec{\lambda_{AC}} \tag{25}$$
$$\vec{T_2} = 0.31Ti + 0.94Tj - 0.17Tk \tag{26}$$
$$\tag{27}$$
$$\vec{T_1} + \vec{T_2} + \vec{W} + \vec{P} + vecQ = 0 \tag{28}$$
$$\sum \|\vec{F_x}\| = P - 0.55T + 0.31T = 0 \tag{29}$$
$$\sum \|\vec{F_y}\| = 0.82T + 0.94T - W = 0 \tag{30}$$
$$\sum \|\vec{F_z}\| = Q - 0.18T - 0.17T = 0 \tag{31}$$
$$\tag{32}$$
$$\tag{33}$$
$$\tag{34}$$
$$T = \frac{W}{0.82 + .094} \tag{35}$$
$$T = 68.18N \tag{36}$$
$$\tag{37}$$
$$P = (0.55 - 0.31)T \tag{38}$$
$$P = 16.36N \tag{39}$$
$$\tag{40}$$
$$Q = (0.18 + .017)T \tag{41}$$
$$Q = 23.86N \tag{42}$$
$$\tag{43}$$