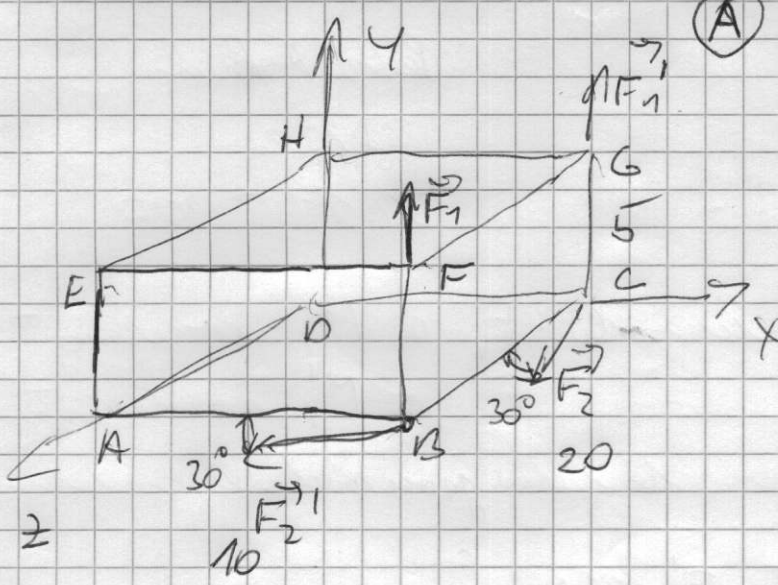


(A)



$\vec{u}; \vec{x}'$
 $F_1 = F_1' = 10 \text{ N}$
 $F_2 = F_2' = 20 \text{ N}$

$F_1 (0; 10; 0) \parallel$
 $F_2 (0; -10; 17,3) \parallel$

$F_1' (0; 10; 0) \parallel$
 $F_2' (-17,3; -10; 0) \parallel$

$\vec{F}_v (0; 0; 17,3) \parallel$
 $\vec{F}_v' (-17,3; 0; 0) \parallel$

$B(10, 0, 20) \quad G(10, 5, 0)$

$C(10, 0, 0)$

$\vec{F}_v \neq \vec{F}_v'$

Uspočet u bodu B:

$\vec{x}: \vec{M}_{uB} = \vec{BF} \times \vec{F}_1 + \vec{BC} \times \vec{F}_2 = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 0 & -20 \\ 0 & -10 & 17,3 \end{vmatrix} = -200 \vec{i} \text{ N}\cdot\text{m}$

$\vec{BF} (0, 0, -20)$

$\vec{x}': \vec{M}_{uB}' = \vec{BG} \times \vec{F}_1' + \vec{BB} \times \vec{F}_2' = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 5 & -20 \\ 0 & 10 & 0 \end{vmatrix} = +200 \vec{i} \text{ N}\cdot\text{m}$

$\vec{BG} (0, 5, -20)$

$\vec{M}_{uB} \neq \vec{M}_{uB}'$

S. s. nejsou algebraicky!

Pr. (B)

$\vec{F}_v (-17,3; 0; 0) \text{ N}$

$\vec{F}_v' (0; 0; 17,3) \text{ N}$

$\vec{M}_{uB} (200; 0; 0) \text{ N}\cdot\text{m}$

$\vec{M}_{uB}' (-200; 0; 0) \text{ N}\cdot\text{m}$

K bodu C:

$$\vec{r} = \vec{C}F \times \vec{F}_1 + \vec{C}C \times \vec{F}_2 = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 5 & 20 \\ 0 & 10 & 0 \end{vmatrix} =$$

$$F(10, 5, 20) \quad \phi$$

$$\vec{C}F(0, 5, 20) = \underline{\underline{-200 \vec{k} \text{ Nm}}}$$

$$\vec{r} = \vec{C}G \times \vec{F}_1 + \vec{C}B \times \vec{F}_2 = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 0 & 20 \\ -17,3 & -10 & 0 \end{vmatrix} =$$

$$\vec{C}B(0, 0, 20) \quad \phi$$

$$\vec{M}_{\vec{C}} \neq \vec{M}_{\vec{C}} = \underline{\underline{(-346 \vec{j} + 200 \vec{k}) \text{ Nm}}}$$

K bodu D:

$$\vec{M}_{\vec{D}} = \vec{D}F \times \vec{F}_1 + \vec{D}C \times \vec{F}_2 = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 10 & 5 & 20 \\ 0 & 10 & 0 \end{vmatrix} = (100\vec{k} - 200\vec{j})$$

$$D(0, 0, 0)$$

$$\vec{D}F(10, 5, 20)$$

$$\vec{D}C(10, 0, 0)$$

$$+ \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 10 & 0 & 0 \\ 0 & -10 & 17,3 \end{vmatrix} = -100\vec{k} - 173\vec{j} =$$

$$\vec{M}_{\vec{D}} = \vec{D}G \times \vec{F}_1 + \vec{D}B \times \vec{F}_2 = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 10 & 5 & 0 \\ 0 & 10 & 0 \end{vmatrix} + \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 10 & 0 & 20 \\ -17,3 & -10 & 0 \end{vmatrix} =$$

$$\vec{D}G(10, 5, 0)$$

$$\vec{D}B(10, 0, 20)$$

$$= 100\vec{k} - 346\vec{j} - 100\vec{k} + 200\vec{j} = \underline{\underline{-346\vec{j} + 200\vec{k}}}$$

$$\vec{M}_{\vec{D}} \neq \vec{M}_{\vec{D}}$$