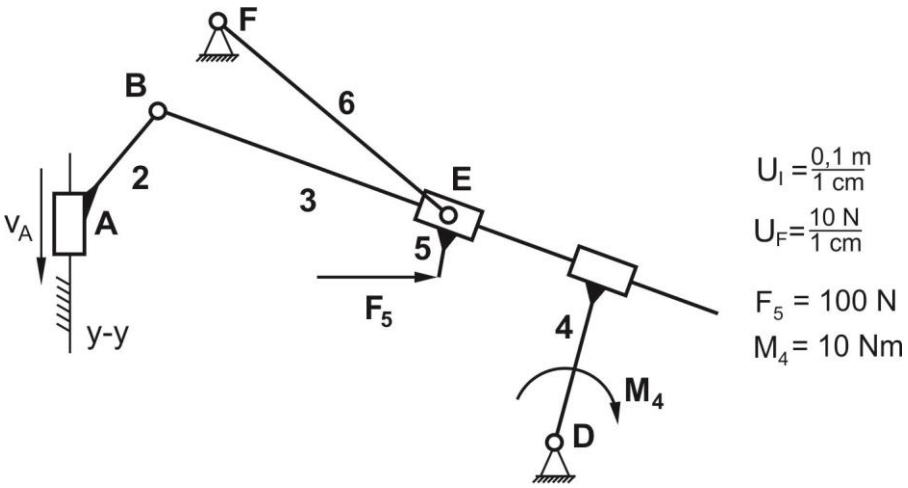
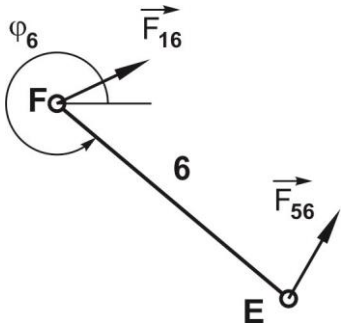
Zadatak 3.4



<u>Član 6</u>

$\vec{F}_{56} = F_{56x}\vec{i} + F_{56y}\vec{j}$

$\vec{F}_{16} = F_{16x}\vec{i} + F_{16y}\vec{j}$



$\sum \vec{F}_i(6) = \vec{F}_{16} + \vec{F}_{56} = 0$

$\sum \vec{M}_F(6) = \overrightarrow{FE} \times \vec{F}_{56} = 0$

$F_{16x} + F_{56x} = 0$ 1.

$F_{16y} + F_{56y} = 0$ 2.

$FE_x \cdot F_{56y} - FE_y \cdot F_{56x} = 0$ 3.

$FE_x = FE\cos\varphi_6$

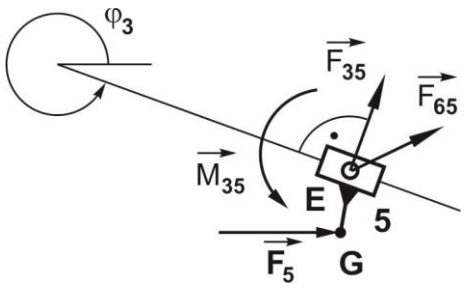
$FE_y = FE\sin\varphi_6$

<u>Član 5</u>

$\vec{F}_{35} = F_{35}\cos(\varphi_3 + \pi/2)\vec{i} + F_{35}\sin(\varphi_3 + \pi/2)\vec{j}$

$\vec{M}_{35} = M_{35}\vec{k}$

$\vec{F}_{65} = -\vec{F}_{56} = -F_{56x}\vec{i} - F_{56y}\vec{j}$



$\sum \vec{F}_i(5) = \vec{F}_{65} + \vec{F}_{35} + \vec{F}_5 = 0$

$\sum \vec{M}_E(5) = \vec{M}_{35} + \overrightarrow{EG} \times \vec{F}_5 = 0$

$\sum \vec{F}_i(5) = \left(-\vec{F}_{56}\right) + \vec{F}_{35} + \vec{F}_5 = 0$

$\sum \vec{M}_E(5) = \vec{M}_{35} + \overrightarrow{EG} \times \vec{F}_5 = 0$

$-F_{56x} + F_{35}\cos(\varphi_3 + \pi/2) + 100 = 0$ 4.

$-F_{56y} + F_{35}\sin(\varphi_3 + \pi/2) + 0 = 0$ 5.

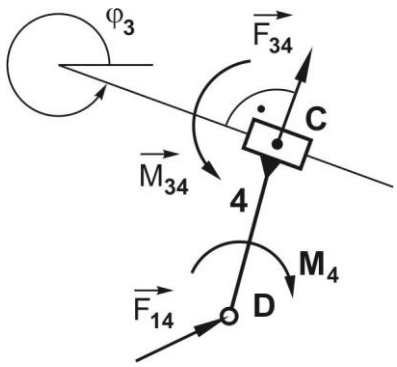
$M_{35} + EG_x \cdot 0 - EG_y \cdot 100 = 0$ 6.

$EG_x = EG\cos(\varphi_3 - \alpha)$

$EG_y = EG\sin(\varphi_3 - \alpha)$

Iz jednačina 1. do 6. računaju se: $F_{16x}, F_{16y}, F_{56x}, F_{56y}, F_{35}, M_{35}$

Član4



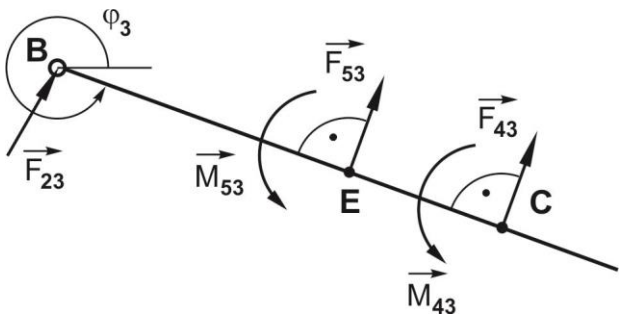
$$\vec{F}_{34} = F_{34}\cos(\varphi_3 + \pi/2)\vec{i} + F_{34}\sin(\varphi_3 + \pi/2)\vec{j}$$
$$\vec{M}_{34} = M_{34}\vec{k}$$
$$\vec{F}_{14} = F_{14x}\vec{i} + F_{14y}\vec{j}$$

$$\sum \vec{F}_i(4) = \vec{F}_{34} + \vec{F}_{14} = 0$$
$$\sum \vec{M}_D(4) = \vec{M}_{34} + \vec{M}_4 + \overrightarrow{DC} \times \vec{F}_{34} = 0$$

$$F_{34}\cos(\varphi_3 + \pi/2) + F_{14x} = 0 \qquad 1.$$
$$F_{34}\sin(\varphi_3 + \pi/2) + F_{14y} = 0 \qquad 2.$$
$$M_{35} + M_4 + DC_x \cdot F_{34}\sin(\varphi_3 + \pi/2) - DC_y \cdot F_{34}\cos(\varphi_3 + \pi/2) = 0 \qquad 3.$$

$$DC_x = DC\cos\varphi_4$$
$$DC_y = DC\sin\varphi_4$$

Član3



$$\vec{F}_{43} = -\vec{F}_{34} = -F_{34}\cos(\varphi_3 + \pi/2)\vec{i} - F_{34}\sin(\varphi_3 + \pi/2)\vec{j}$$
$$\vec{M}_{43} = -\vec{M}_{34} = -M_{34}\vec{k}$$
$$\vec{F}_{53} = -\vec{F}_{35} = -F_{35}\cos(\varphi_3 + \pi/2)\vec{i} - F_{35}\sin(\varphi_3 + \pi/2)\vec{j}$$
$$\vec{M}_{53} = -\vec{M}_{35} = -M_{35}\vec{k}$$
$$\vec{F}_{23} = F_{23x}\vec{i} + F_{23y}\vec{j}$$

$$\sum \vec{F}_i(3) = \vec{F}_{23} + \vec{F}_{43} + \vec{F}_{53} = 0$$
$$\sum \vec{M}_B(3) = \vec{M}_{43} + \vec{M}_{53} + \overrightarrow{BE} \times \vec{F}_{53} + \overrightarrow{BC} \times \vec{F}_{43} = 0$$

$$\sum \vec{F}_i(3) = \vec{F}_{23} + \left(-\vec{F}_{34}\right) + \left(-\vec{F}_{35}\right) = 0$$
$$\sum \vec{M}_B(3) = \left(-\vec{M}_{34}\right) + \vec{M}_{53} + \overrightarrow{BE} \times \left(-\vec{F}_{35}\right) + \overrightarrow{BC} \times \left(-\vec{F}_{34}\right) = 0$$

$$-F_{34}\cos(\varphi_3 + \pi/2) - F_{35}\cos(\varphi_3 + \pi/2) + F_{23x} = 0 \qquad 4.$$
$$-F_{34}\sin(\varphi_3 + \pi/2) - F_{35}\cos(\varphi_3 + \pi/2) + F_{23y} = 0 \qquad 5.$$
$$M_{34} - 10 + BE_x \cdot \left(-F_{35}\sin(\varphi_3 + \pi/2)\right) - BE_y \cdot \left(-F_{35}\cos(\varphi_3 + \pi/2)\right) +$$
$$+BC_x \cdot \left(-F_{34}\sin(\varphi_3 + \pi/2)\right) - BC_y \cdot \left(-F_{34}\cos(\varphi_3 + \pi/2)\right) = 0 \qquad 6.$$

$$BE_x = BE\cos\varphi_3 \qquad BC_x = BC\cos\varphi_3$$
$$BE_y = BE\sin\varphi_3 \qquad BC_y = BC\sin\varphi_3$$

Iz jednačina 1. do 6. računaju se: $F_{14x}, F_{14y}, F_{23x}, F_{23y}, F_{34}, M_{14}$

Član2

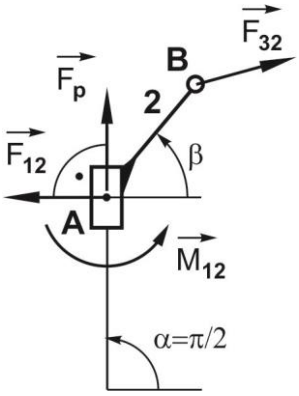
$\alpha = \pi/2$

$\vec{F}_{12} = F_{12}\cos(\alpha + \pi/2)\vec{i} + F_{12}\sin(\alpha + \pi/2)\vec{j} = F_{12}\cos\pi\vec{i} + F_{12}\sin\pi\vec{j}$

$\vec{M}_{12} = M_{12}\vec{k}$

$\vec{F}_p = F_p\cos\alpha\vec{j} + F_p\sin\alpha\vec{j} = F_p\vec{j}$

$\vec{F}_{32} = -\vec{F}_{23} = -F_{23x}\vec{i} - F_{23y}\vec{j}$



$\sum \vec{F}_i(2) = \vec{F}_{12} + \vec{F}_{32} + \vec{F}_p = 0$

$\sum \vec{M}_A(2) = \vec{M}_{12} + \overrightarrow{AB} \times \vec{F}_{32} = 0$

$\sum \vec{F}_i(2) = \vec{F}_{12} + \left(-\vec{F}_{23}\right) + \vec{F}_p = 0$

$\sum \vec{M}_A(2) = \vec{M}_{12} + \overrightarrow{AB} \times \left(-\vec{F}_{23}\right) = 0$

$F_{12}\cos\pi - F_{23x} + 0 = 0$ 1.

$F_{12}\sin\pi - F_{23y} + F_p = 0$ 2.

$M_{12} + AB_x \cdot \left(-F_{23y}\right) - AB_y \cdot \left(-F_{23x}\right) = 0$ 3.

$AB_x = AB\cos\beta$

$AB_y = AB\sin\beta$

Iz jednačina 1. do 3. računaju se: F_p, F_{12}, M_{12}