TEHNIČKA MEHANIKA

Inženjerstvo zaštite životne sredine

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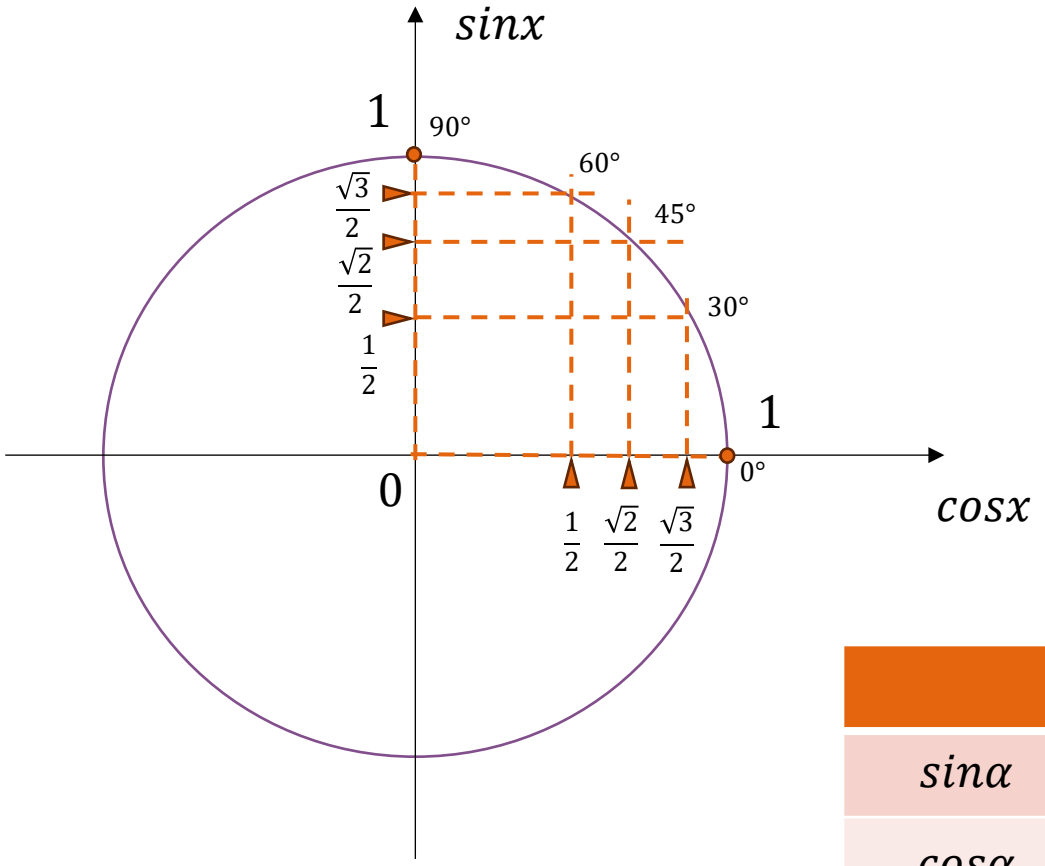
TRIGONOMETRIJSKI KRUG



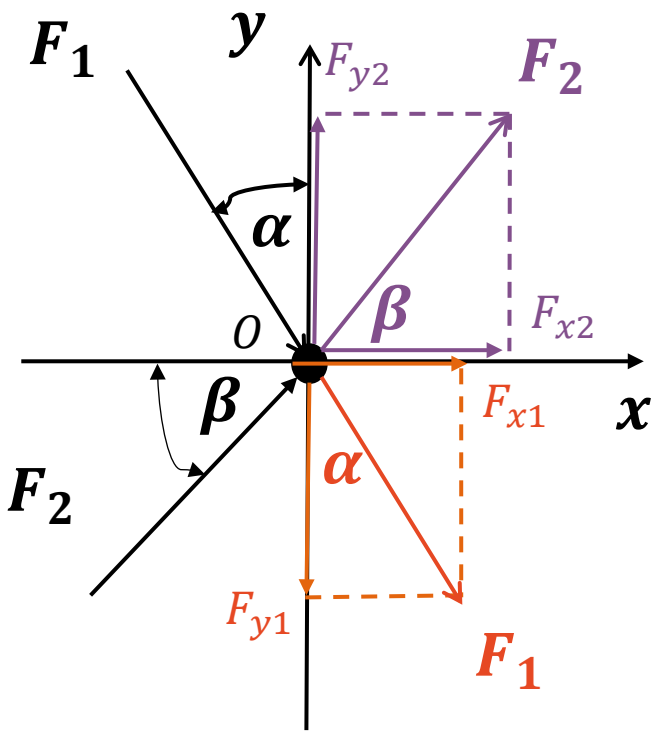
	0°	30°	45°	60°	90°
$sin\alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$cos\alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0

PROJEKCIJA SILE NA X I Y OSU

ZADATAK 4.

Izračunati intenzitete komponenti sila F_1 *i* F_2, *ako je* $F_1 = 12N, F_2 = 8N, \alpha = 30°, \beta = 60°.$

$F_{x1} = ? \; ; F_{y1} = ? \; ; F_{x2} = ? \; ; F_{y2} = ?$



$$sin\alpha = \frac{F_{1x}}{F_1}$$

$$F_{x1} = F_1 * sin\alpha$$

$$F_{x1} = 12 * sin30°$$

$$F_{x1} = 12 * \frac{1}{2}$$

$$F_{x1} = 6\ N$$

$$cos\alpha = \frac{F_{1y}}{F_1}$$

$$F_{y1} = F_1 * cos\alpha$$

$$F_{y1} = 12 * cos30°$$

$$F_{y1} = 12 * \frac{\sqrt{3}}{2}$$

$$F_{y1} = 6\sqrt{3}\text{N}$$

$$F_{x2} = F_2 * cos\beta$$

$$F_{x2} = 8 * cos60°$$

$$F_{x2} = 8 * \frac{1}{2}$$

$$F_{x2} = 4\text{N}$$

$$F_{y2} = F_2 * sin\beta$$

$$F_{y2} = 8 * sin60°$$

$$F_{y2} = 8 * \frac{\sqrt{3}}{2}$$

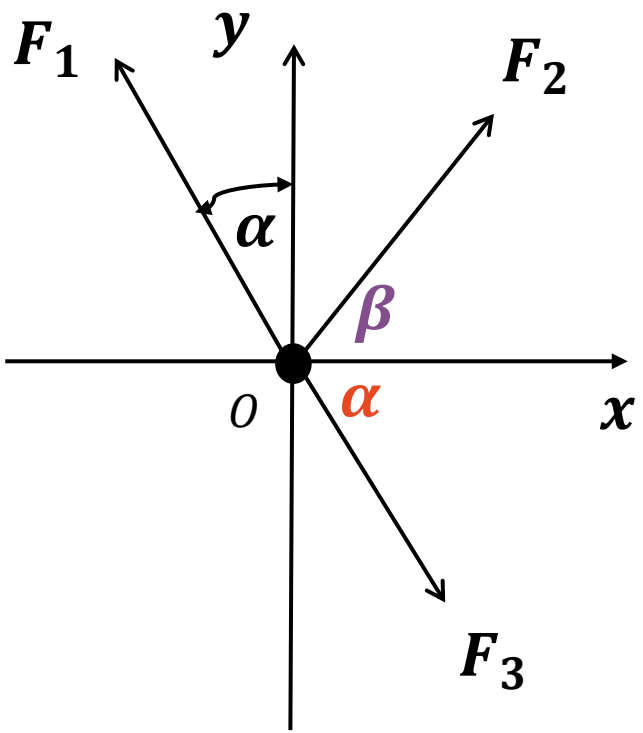
$$F_{y2} = 4\sqrt{3}\text{N}$$

PROJEKCIJA SILE NA X I Y OSU

ZADATAK 5.

Izračunati intenzitete komponenti sila F_1 *i* F_2*, ako je* $F_1 = 20N, F_2 = 8N, F_3 = 9N, \alpha = 30°, \beta = 60°.$

$F_{x1} = ? \; ; F_{y1} = ? \; ; F_{x2} = ? \; ; F_{y2} = ? \; ; F_{x3} = ? \; ; F_{y3} = ?$



REŠENJE:

$F_{x1} = 10\ N$

$F_{y1} = 10\sqrt{3}\text{N}$

$F_{x2} = 4\text{N}$

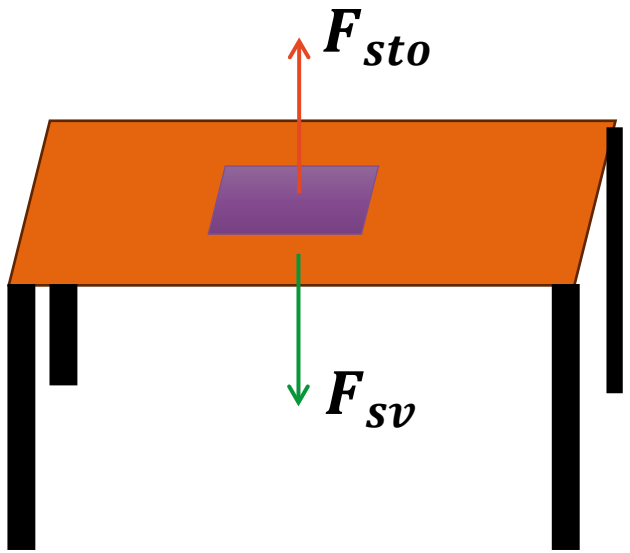
$F_{y2} = 4\sqrt{3}\text{N}$

$F_{x3} = 4.5\sqrt{3}\text{N}$

$F_{y3} = 4.5\text{N}$

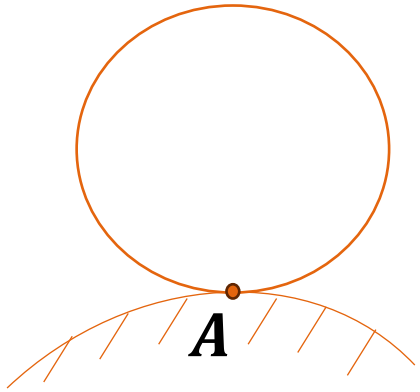
VEZE I REAKCIJE VEZA

Svako telo čije je slobodno kretanje u prostoru ograničeno bilo kojim drugim telom, naziva se VEZANO – NE SLOBODNO TELO

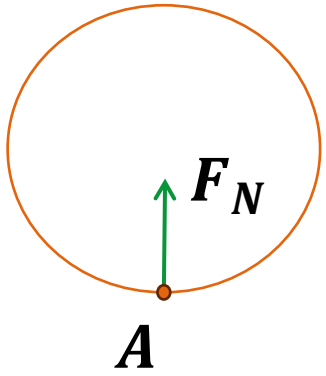


GLATKE POVRŠI ILI OSLONAC

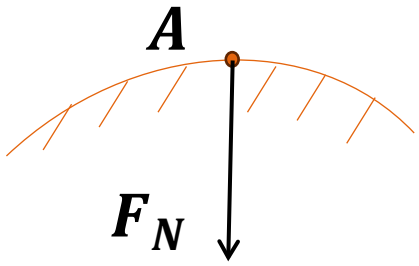
Ako se može zanemariti trenje koje se javlja između dva tela koja se dodiruju. onda se takve površi smatraju GLATKIM.



REAKCIJA (podloga) dodiruje telo

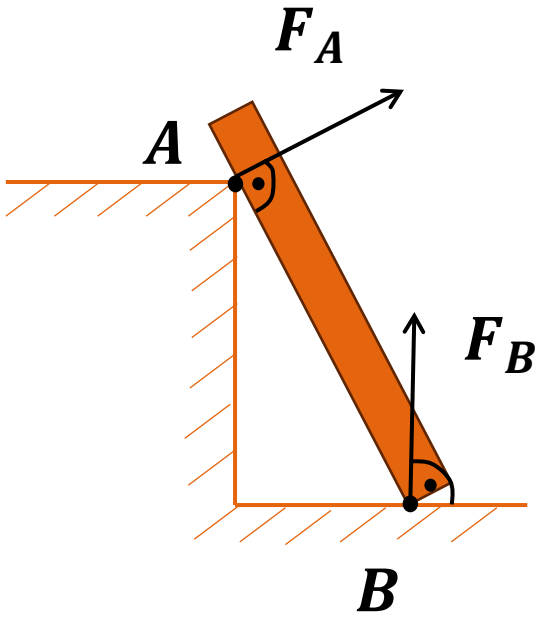


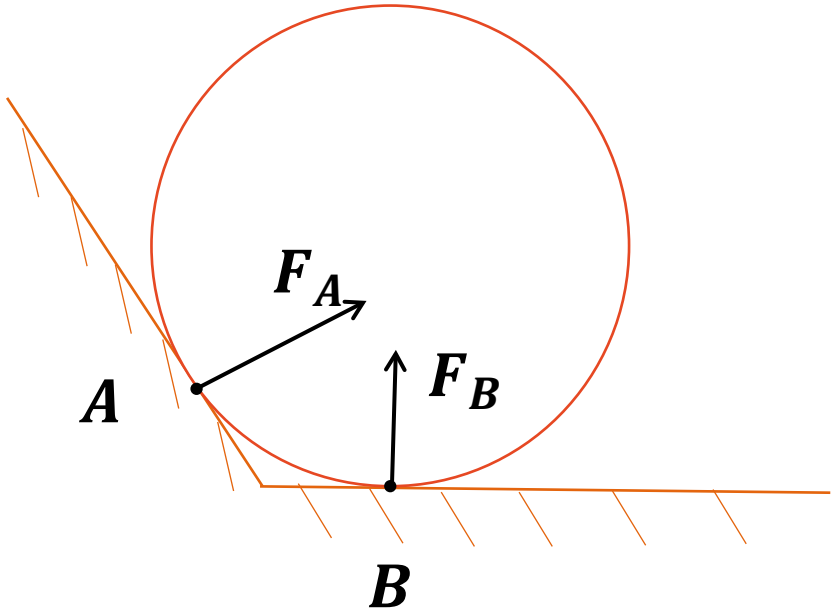
telo dodiruje podlogu



GLATKE POVRŠI ILI OSLONAC

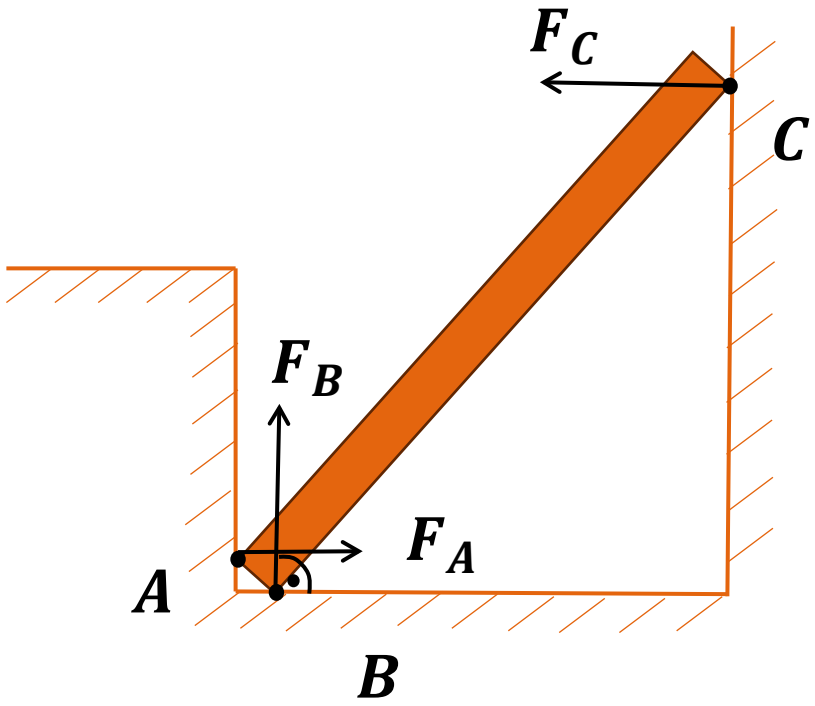
Kada jedna od dodirnih površi predstavlja tačku, onda reakcija veze leži na normali druge površi.





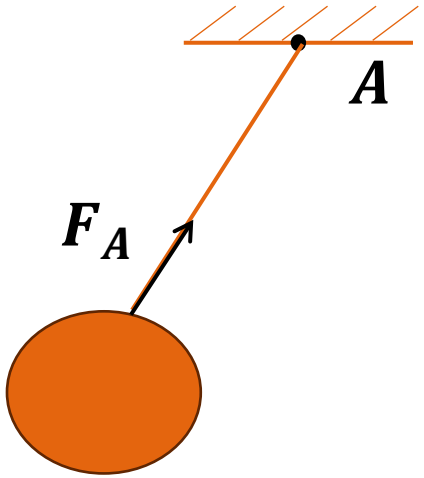
GLATKE POVRŠI ILI OSLONAC

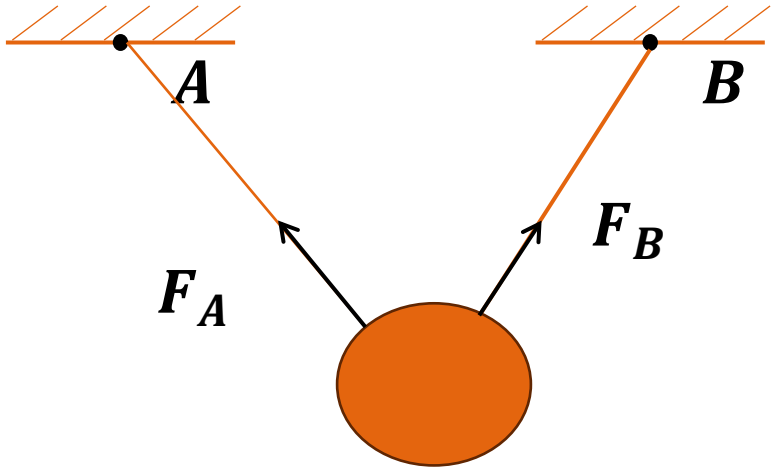
Ako se kruto telo svojim krajem oslanja na ugao, onda ugao sprečava pomeranje ovog kraja po horizontali ulevo $(x - pravac)$ i vertikali naniže $(y - pravac)$.



UŽE

Veza ostvarena pomoću užeta, lanca, kaiša itd. nedozvoljavaju teretu da se idalje od tačke A.



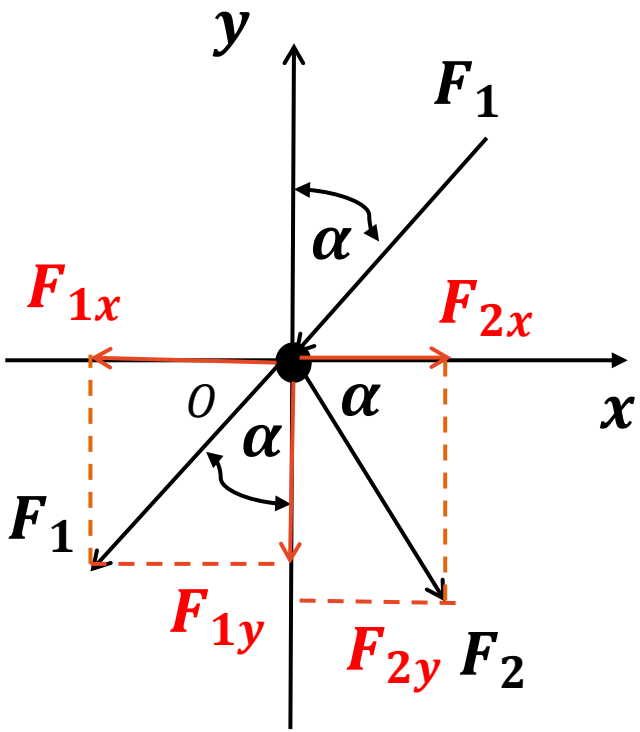


PROJEKCIJA SILE NA X I Y OSU

ZADATAK 1.

Izračunati intenzitete komponenti sila F_1 i F_2, ako je $F_1 = 4\ kN, F_2 = 12\ kN, \alpha = 60°$.

$F_{x1} = ?\ ; F_{y1} = ?\ ; F_{x2} = ?\ ; F_{y2} = ?$



REŠENJE:

$F_{1x} = F_1 * sin\alpha$

$F_{1x} = 4 * sin60°$

$F_{1x} = 4 * \frac{\sqrt{3}}{2}$

$F_{1x} = 2\sqrt{3}\ kN$

$F_{1y} = F_1 * cos\alpha$

$F_{1y} = 4 * cos60°$

$F_{1y} = 4 * \frac{1}{2}$

$F_{1y} = 2$ kN

$F_{2x} = F_2 * cos\alpha$

$F_{2x} = 12 * cos60°$

$F_{2x} = 12 * \frac{1}{2}$

$F_{2x} = 6\ kN$

$F_{2y} = F_2 * sin\alpha$

$F_{2y} = 12 * sin60°$

$F_{2y} = 12 * \frac{\sqrt{3}}{2}$

$F_{2y} = 6\sqrt{3}$ kN

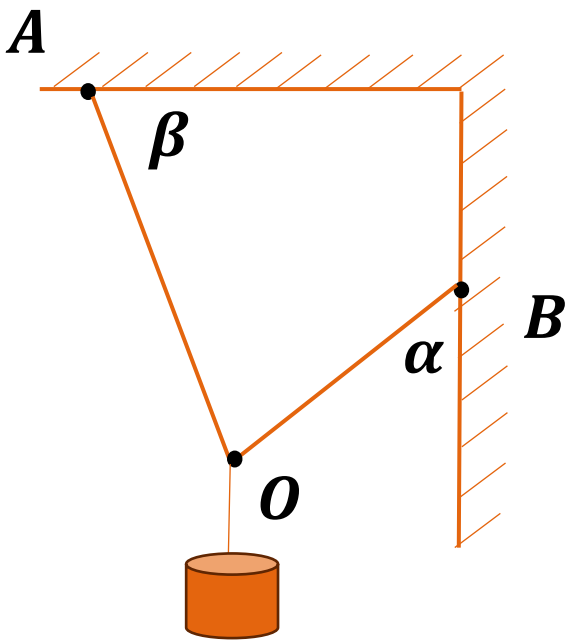
PROJEKCIJA SILE NA X I Y OSU

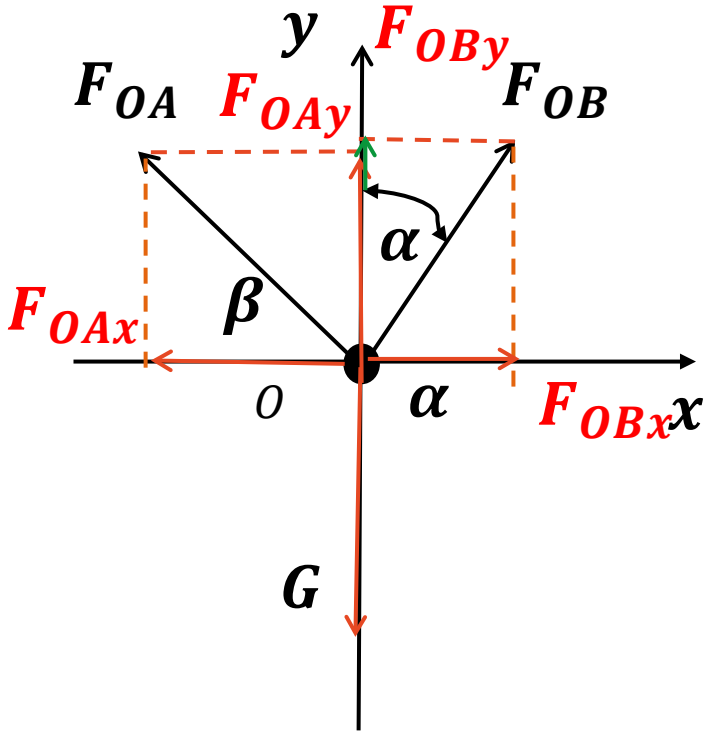
ZADATAK 2.

Izračunati intenzitete komponenti sila F_1 i F_2, ako je $F_{0B} = 20\ kN, F_{OA} = 12\ kN, \alpha = 45°, \beta = 60°$.

$F_{x1} = ?\ ; F_{y1} = ?\ ; F_{x2} = ?\ ; F_{y2} = ?$

REŠENJE:



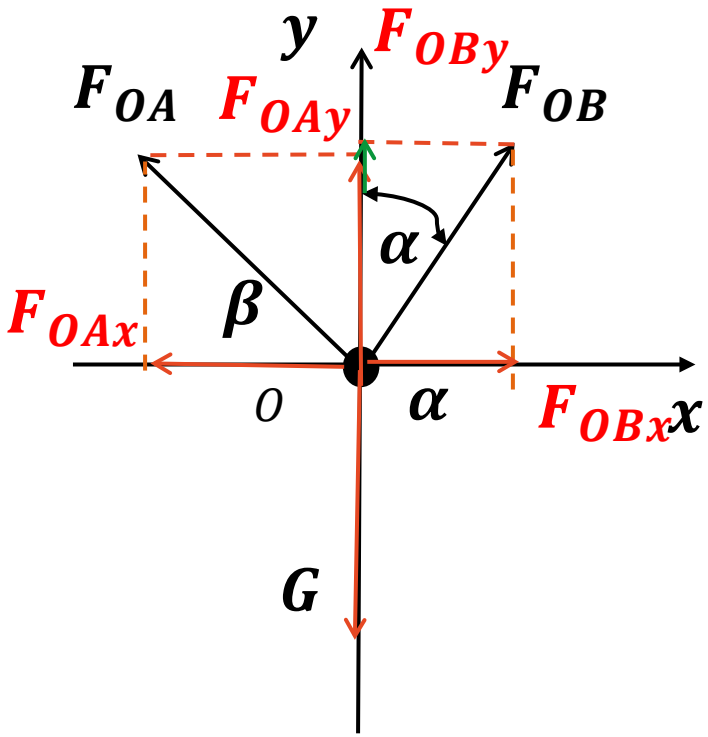


PROJEKCIJA SILE NA X I Y OSU

ZADATAK 2.

Izračunati intenzitete komponenti sila F_1 *i* F_2*, ako je* $F_{0B} = 20\ kN, F_{OA} = 12\ kN, \alpha = 45°, \beta = 60°.$

$F_{x1} = ?\ ; F_{y1} = ?\ ; F_{x2} = ?\ ; F_{y2} = ?$



REŠENJE:

$F_{OAx} = F_{OA} * cos\beta$

$F_{OAx} = 12 * cos60°$

$F_{OAx} = 12 * \frac{1}{2}$

$F_{OAx} = 6\ kN$

$F_{OAy} = F_{OA} * sin\beta$

$F_{OAy} = 12 * sin60°$

$F_{OAy} = 12 * \frac{\sqrt{3}}{2}$

$F_{OAy} = 6\sqrt{3}\text{kN}$

$F_{OBx} = F_{OB} * sin\alpha$

$F_{OBx} = 20 * sin45°$

$F_{OBx} = 20 * \frac{\sqrt{2}}{2}$

$F_{OBx} = 10\sqrt{2}kN$

$F_{OBy} = F_{OB} * cos\alpha$

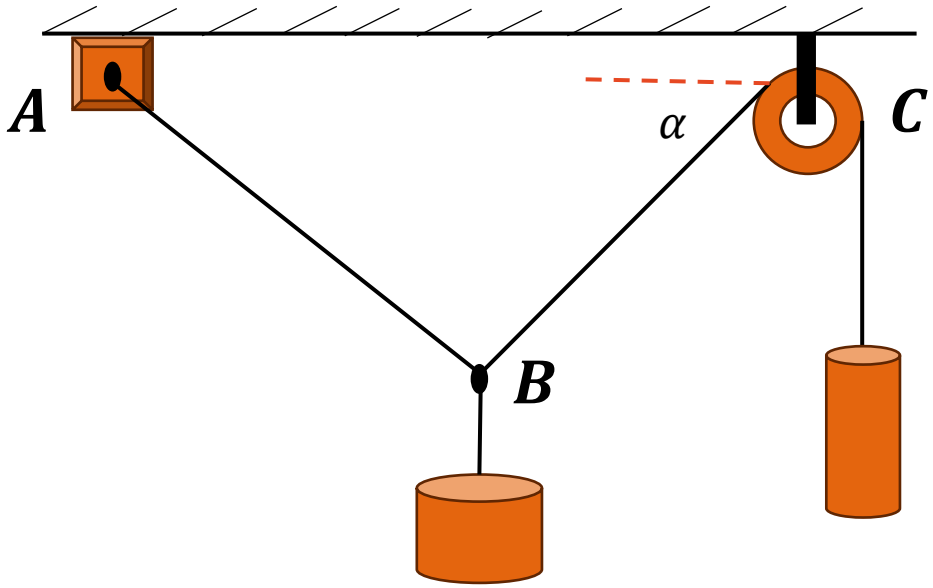
$F_{OBy} = 20 * sin45°$

$F_{OBy} = 20 * \frac{\sqrt{2}}{2}$

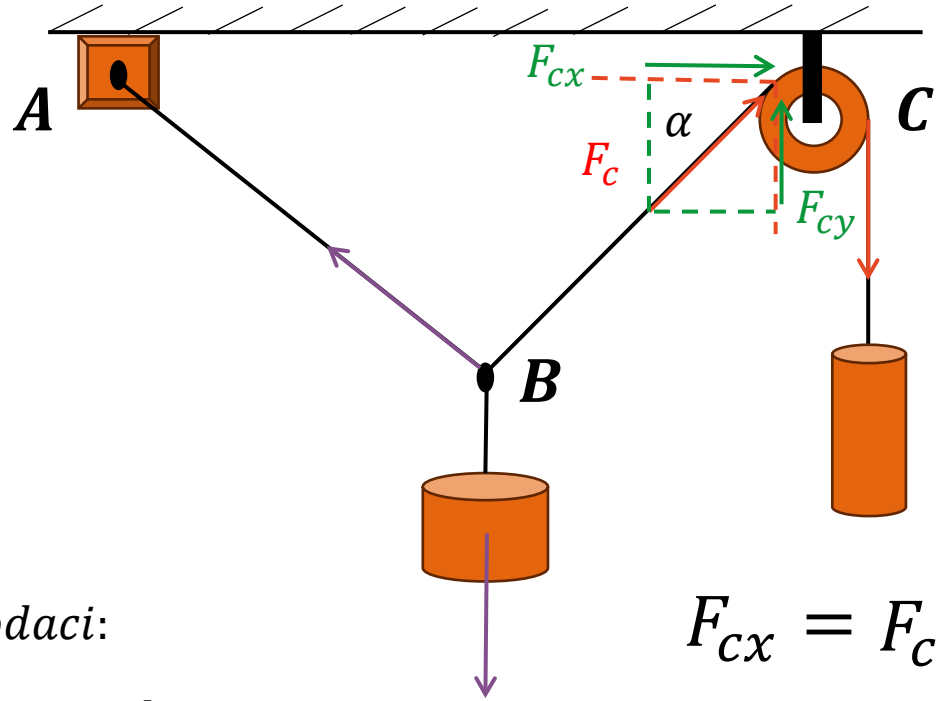
$F_{OBy} = 10\sqrt{2}kN$

ZADATAK 3.

- Za sistem prikazan na slici, potrebno je odrediti komponente sile u užetu BC. Ako je težina tela u tački B =*30kg* a u tački C =*78kg*, ugao $\alpha = 30°$.



ZADATAK 3.



$$F_c = m_c * \mathrm{a} \longrightarrow a = g = 9.81\ \frac{m}{s^2}$$

$$F_c = 78 * 9.81$$

$$F_c = 765.18\ N$$

Podaci:

$m_b = 30\ kg$

$m_c = 78\ kg$

$\alpha = 30°$

$F_{cx} = ?\quad F_{cy} = ?$

$$F_{cx} = F_c * cos\alpha$$

$$F_{cx} = 765.18 * cos30$$

$$F_{cx} = 662.665\ N$$

$$F_{cy} = F_c * sin\alpha$$

$$F_{cy} = 765.18 * sin30$$

$$F_{cy} = 382.59\ N$$

HVALA NA PAŽNJI!

PITANJA?