1. kolokvij iz Osnov mehanike, 16. april 2026

1. Za prostorski sistem sil podan na sliki s silami v smereh stranice in diagonal kvadra $a \times b \times c$ z dimenzijami 3 m × 4 m × 2 m:

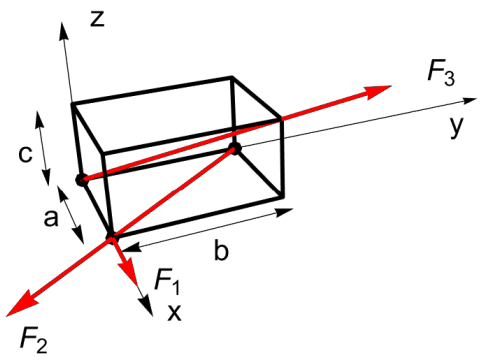
   (a) določi sile in njihova prijemališča;

   (b) izračunaj rezultanto sil in navora glede na pol v vogalu kvadra;

   (c) izračunaj invarianto sistema sil;

   (d) določi skupno prijemališče ali os sistema.

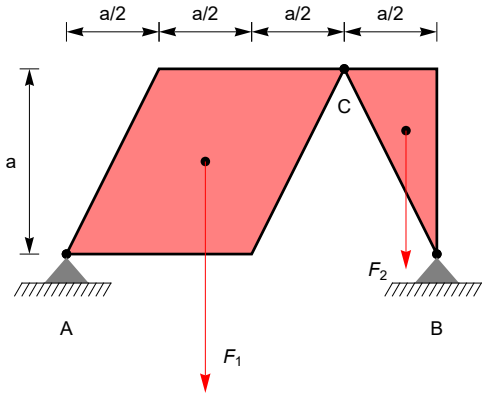
   Velikosti sil so $F_1 = 2F_0$, $F_2 = 5F_0$ in $F_3 = \sqrt{29}F_0$.



2. Dve homogeni plošči, glej skico, sta členkasto spojeni v točki C in nepomično podprti v A in B. Masa posamezne plošče je sorazmerna njeni površini, sila teže pa deluje v navpični smeri navzdol.

   (a) Določi masni središči plošč in sili teže na plošči.

   (b) Določi sile v podporah.

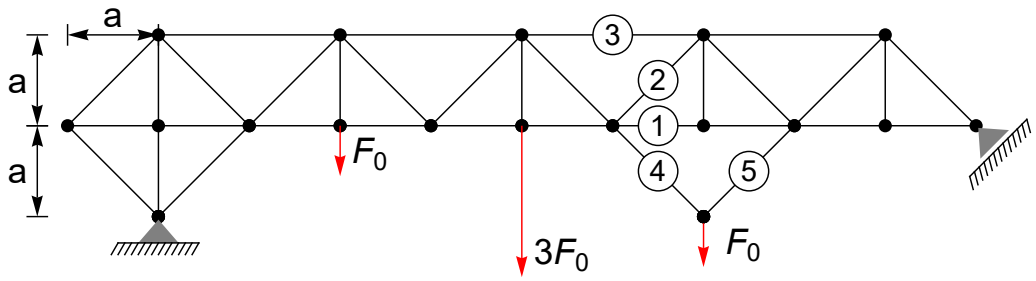


3. Za podano paličje na sliki, z drsno desno podporo pod kotom $\pi/4$:

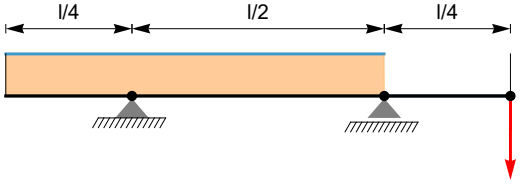
   (a) določi sile v podporah;

   (b) določi sili palic 4 in 5;

   (c) izračunaj sile palic 1,2 in 3.



Prevesni nosilec dolžine l na sliki je levo od desne podpore enakmerno linijsko obremenjen z gostoto q_0, na prevesnem koncu pa je obremenjen s silo $F = lq_0/2$, glej sliko.



   (a) Izračunaj sili podpor.

   (b) Določi potek prečne sile in upogibnega momenta.

Rešitve (rešeno z AI Claud - Sonnet 4.6)

1. **Prva naloga**

- **Geometrija kvadra:** Dimenzije kvadra: $a = 3\,\mathrm{m}$, $b = 4\,\mathrm{m}$, $c = 2\,\mathrm{m}$. Izhodišče koordinatnega sistema O je v spodnjem sprednjem levem vogalu kvadra.
- **Sile in njihova prijemališča**
  Sila $\vec{F}_1$: velikost $F_1 = 2F_0$, deluje vzdolž stranice a v smeri $+x$, prijemališče $O = (0, 0, 0)$:
  $$\vec{F}_1 = 2F_0\,(1,\,0,\,0).$$
  Sila $\vec{F}_2$: velikost $F_2 = 5F_0$, deluje vzdolž diagonale osnovne ploskve od točke (0, 4, 0) do točke (3, 0, 0), prijemališče (0, 4, 0):
  $$\vec{F}_2 = 5F_0 \cdot \frac{(3,\,-4,\,0)}{5} = F_0\,(3,\,-4,\,0).$$
  Sila $\vec{F}_3$: velikost $F_3 = \sqrt{29}\,F_0$, deluje vzdolž prostorske diagonale kvadra v smeri (3, 4, 2), prijemališče $O = (0, 0, 0)$:
  $$\vec{F}_3 = \sqrt{29}\,F_0 \cdot \frac{(3,\,4,\,2)}{\sqrt{29}} = F_0\,(3,\,4,\,2).$$
- **Rezultanta sil in navor glede na pol O**
  Rezultanta sil:
  $$\begin{aligned}\vec{R} &= \vec{F}_1 + \vec{F}_2 + \vec{F}_3\\ &= 2F_0\,(1,0,0) + F_0\,(3,-4,0) + F_0\,(3,4,2)\\ &= F_0\,(2+3+3,\ 0-4+4,\ 0+0+2)\end{aligned}$$
  $$\boxed{\vec{R} = F_0\,(8,\,0,\,2), \qquad |\vec{R}| = 2\sqrt{17}\,F_0.}$$
  Rezultanta navorov O
  Ker imata $\vec{F}_1$ in $\vec{F}_3$ prijemališče v O, sta njuna navora enaka nič:
  $$\vec{M}_1 = \vec{0}, \qquad \vec{M}_3 = \vec{0}.$$
  Navor sile $\vec{F}_2$ ($\vec{r}_2 = (0,\,4,\,0)$):
  $$\vec{M}_2 = \vec{r}_2 \times \vec{F}_2 = F_0 \begin{vmatrix} \hat{x} & \hat{y} & \hat{z} \\ 0 & 4 & 0 \\ 3 & -4 & 0 \end{vmatrix} = F_0\big((4\cdot 0 - 0\cdot(-4)),\ (0\cdot 3 - 0\cdot 0),\ (0\cdot(-4) - 4\cdot 3)\big) = F_0\,(0,\,0,\,-12).$$
  Skupni navor:
  $$\boxed{\vec{M}_O = F_0\,(0,\,0,\,-12).}$$
- **Invarianta sistema sil**
  $$\begin{aligned}I &= \vec{R} \cdot \vec{M}_O = F_0\,(8,\,0,\,2) \cdot F_0\,(0,\,0,\,-12)\\ &= F_0^2\,(8\cdot 0 + 0\cdot 0 + 2\cdot(-12))\end{aligned}$$
  $$\boxed{I = -24\,F_0^2.}$$
  Ker $I \neq 0$, sistem sil nima skupnega prijemališča.

- **Os sistema (vijačnica)**

$$p = \frac{I}{|\vec{R}|^2} = \frac{-24\,F_0^2}{68\,F_0^2} = -\frac{6}{17}\,\mathrm{m}.$$

Točka na osi $\vec{r}_0 = \dfrac{\vec{R}\times\vec{M}_O}{|\vec{R}|^2}$:

$$\vec{R}\times\vec{M}_O = F_0^2\begin{vmatrix}\hat{x} & \hat{y} & \hat{z}\\ 8 & 0 & 2\\ 0 & 0 & -12\end{vmatrix} = F_0^2\big((0\cdot(-12)-2\cdot 0),\ (2\cdot 0-8\cdot(-12)),\ (8\cdot 0-0\cdot 0)\big) = F_0^2\,(0,\,96,\,0).$$

$$\vec{r}_0 = \frac{F_0^2\,(0,\,96,\,0)}{68\,F_0^2}$$

$$\boxed{\vec{r}_0 = \left(0,\ \frac{24}{17},\ 0\right)\,\mathrm{m}.}$$

Os vijačnice poteka skozi točko $\vec{r}_0 = \big(0,\,\frac{24}{17},\,0\big)\,\mathrm{m}$ v smeri $\vec{R} = F_0\,(8,\,0,\,2)$ s korakom $p = -\dfrac{6}{17}\,\mathrm{m}$.

2. **Druga naloga**

- **Geometrija**
  Leva plošča (romb): oglišča $\mathrm{A}(0,0)$, $\big(\frac{a}{2},a\big)$, $\mathrm{C}\big(\frac{3a}{2},a\big)$, $(a,0)$.
  Desna plošča (trikotnik): oglišča $\mathrm{B}(2a,0)$, $\mathrm{C}\big(\frac{3a}{2},a\big)$, $(2a,a)$.
- Masni središči in sili teže
  Leva plošča – romb
  Romb razdelimo na dva trikotnika z diagonalo $\mathrm{A}(0,0)$–$\mathrm{C}\big(\frac{3a}{2},a\big)$:
  Trikotnik 1: $\mathrm{A}(0,0)$, $\big(\frac{a}{2},a\big)$, $\mathrm{C}\big(\frac{3a}{2},a\big)$:

$$S_{t1} = \frac{1}{2}\cdot a\cdot a = \frac{a^2}{2}, \qquad \vec{r}_{t1} = \frac{1}{3}\left(\frac{a}{2}+\frac{3a}{2},\ a+a\right) = \left(\frac{2a}{3},\ \frac{2a}{3}\right).$$

Trikotnik 2: $\mathrm{A}(0,0)$, $\mathrm{C}\big(\frac{3a}{2},a\big)$, $(a,0)$:

$$S_{t2} = \frac{1}{2}\left|\frac{3a}{2}\cdot 0 + a\cdot 0 - a\cdot a\right| = \frac{a^2}{2}, \qquad \vec{r}_{t2} = \frac{1}{3}\left(\frac{3a}{2}+a,\ a\right) = \left(\frac{5a}{6},\ \frac{a}{3}\right).$$

Skupna površina: $S_1 = a^2$. Masno središče romba:

$$\vec{r}_{c1} = \frac{S_{t1}\,\vec{r}_{t1} + S_{t2}\,\vec{r}_{t2}}{S_1} = \frac{\dfrac{a^2}{2}\left(\dfrac{2a}{3},\dfrac{2a}{3}\right) + \dfrac{a^2}{2}\left(\dfrac{5a}{6},\dfrac{a}{3}\right)}{a^2} = \frac{1}{2}\left(\frac{3a}{2},\ a\right).$$

$$\boxed{\vec{r}_{c1} = \left(\frac{3a}{4},\ \frac{a}{2}\right).}$$

Desna plošča – trikotnik

$$S_2 = \frac{1}{2}\cdot\frac{a}{2}\cdot a = \frac{a^2}{4}, \qquad \vec{r}_{c2} = \frac{1}{3}\left(2a+\frac{3a}{2}+2a,\ 0+a+a\right).$$

$$\boxed{\vec{r}_{c2} = \left(\frac{11a}{6},\ \frac{2a}{3}\right).}$$

Sili teže:

$$\frac{G_1}{G_2} = \frac{S_1}{S_2} = \frac{a^2}{a^2/4} = 4 \qquad \Longrightarrow \qquad \boxed{G_1 = 4G, \quad G_2 = G,}$$

kjer je $G = \rho g \dfrac{a^2}{4}$ in ρ površinska gostota.

- Sile v podporah

Neznanke: A_x, A_y v A$(0,0)$; B_x, B_y v B$(2a,0)$; C_x, C_y v členku C$\left(\frac{3a}{2}, a\right)$.
Moment sile (F_x, F_y) v točki (x,y) okrog točke (x_0, y_0):

$$M = (x - x_0)\, F_y - (y - y_0)\, F_x.$$

Ravnotežje desne plošče
$\sum M_B = 0$ (okrog B$(2a,0)$):

$$\left(\frac{3a}{2} - 2a\right) C_y - (a - 0)\, C_x + \left(\frac{11a}{6} - 2a\right)(-G) = 0,$$

$$-\frac{a}{2} C_y - a C_x + \frac{Ga}{6} = 0.$$

$$6C_x + 3C_y = G. \tag{1}$$

$\sum M_C = 0$ (okrog C$\left(\frac{3a}{2}, a\right)$):

$$\left(2a - \frac{3a}{2}\right) B_y - (0 - a)\, B_x + \left(\frac{11a}{6} - \frac{3a}{2}\right)(-G) = 0,$$

$$\frac{a}{2} B_y + a B_x - \frac{Ga}{3} = 0.$$

$$2B_x + B_y = \frac{2G}{3}. \tag{2}$$

$\sum F_x = 0$**:**

$$C_x + B_x = 0. \tag{3}$$

$\sum F_y = 0$**:**

$$C_y + B_y = G. \tag{4}$$

Ravnotežje leve plošče
Na levo ploščo deluje $(-C_x, -C_y)$ v C (3. Newtonov zakon).
$\sum M_A = 0$ (okrog A$(0,0)$):

$$\frac{3a}{4} \cdot (-4G) + \frac{3a}{2} \cdot (-C_y) - a \cdot (-C_x) = 0,$$

$$-3Ga - \frac{3a}{2} C_y + a C_x = 0.$$

$$2C_x - 3C_y = 6G. \tag{5}$$

$\sum F_x = 0$**:**

$$A_x - C_x = 0. \tag{6}$$

$\sum F_y = 0$**:**

$$A_y - 4G - C_y = 0. \tag{7}$$

Reševanje sistema enačb
Seštejemo enačbi (1) in (5):

$$\begin{array}{rcl} 6C_x + 3C_y &=& G \\ 2C_x - 3C_y &=& 6G \\ \hline 8C_x &=& 7G \end{array} \qquad \Longrightarrow \qquad \boxed{C_x = \frac{7G}{8}.}$$

Iz enačbe (1):

$$C_y = \frac{G - 6\cdot\frac{7G}{8}}{3} = \frac{G - \frac{21G}{4}}{3} = \frac{-\frac{17G}{4}}{3} \qquad \Longrightarrow \qquad \boxed{C_y = -\frac{17G}{12}.}$$

Iz (3): $B_x = -C_x = -\dfrac{7G}{8}$.

Iz (4): $B_y = G - C_y = G + \dfrac{17G}{12} = \dfrac{29G}{12}$.

Iz (6): $A_x = C_x = \dfrac{7G}{8}$.

Iz (7): $A_y = 4G + C_y = 4G - \dfrac{17G}{12} = \dfrac{31G}{12}$.

Rezultati

$$\boxed{A_x = \frac{7G}{8}, \qquad A_y = \frac{31G}{12},}$$

$$\boxed{B_x = -\frac{7G}{8}, \qquad B_y = \frac{29G}{12}.}$$

- Preveritev

$$\sum F_x: \quad A_x + B_x = \frac{7G}{8} - \frac{7G}{8} = 0 \quad \checkmark$$

$$\sum F_y: \quad A_y + B_y = \frac{31G}{12} + \frac{29G}{12} = 5G = G_1 + G_2 \quad \checkmark$$

$$\sum M_A: \quad -4G\cdot\frac{3a}{4} - G\cdot\frac{11a}{6} + \frac{29G}{12}\cdot 2a = aG\left(-3 - \frac{11}{6} + \frac{29}{6}\right) = aG(-3+3) = 0 \quad \checkmark$$

3. **Tretja naloga**

- Geometrija in podatki
  - **Leva podpora A** (členkasta): $(0, 0)$
  - **Desna podpora B** (drsna, $\pi/4$): $(9a,\, a)$
  - **Obremenitve:** $F_0 \downarrow$ v $(2a, a)$, $3F_0 \downarrow$ v $(4a, 0)$, $F_0 \downarrow$ v $(6a, 0)$
  - **Palice:** P1: $(5a, a)$–$(7a, a)$, P2: $(5a, a)$–$(6a, 2a)$, P3: $(4a, 2a)$–$(6a, 2a)$, P4: $(5a, a)$–$(6a, 0)$, P5: $(6a, 0)$–$(7a, a)$
- **Sile v podporah**

  Reakcija drsne podpore B je pravokotna na smer drsenja $\pi/4$, torej $\vec{R}_B = \dfrac{R_B}{\sqrt{2}}(-1,\, 1)$.

  Moment sile (F_x, F_y) v točki (x, y) okrog $(0, 0)$: $M = xF_y - yF_x$.

  $\sum M_A = 0$**:**

$$-F_0\cdot 2a - F_0\cdot a - 3F_0\cdot 4a - F_0\cdot 6a + \frac{R_B}{\sqrt{2}}\cdot 9a + \frac{R_B}{\sqrt{2}}\cdot a = 0,$$

$$-2aF_0 - 12aF_0 - 6aF_0 + \frac{10aR_B}{\sqrt{2}} = 0.$$

$$\boxed{R_B = 2\sqrt{2}\,F_0, \qquad \vec{R}_B = F_0(-2,\, 2).}$$

  $\sum F_x = 0$**:**

$$\boxed{A_x = 2F_0.}$$

  $\sum F_y = 0$**:**

$$A_y - F_0 - 3F_0 - F_0 + 2F_0 = 0 \qquad \Longrightarrow \qquad \boxed{A_y = 3F_0.}$$

- **Sili palic 4 in 5**
  Vozlišče $(6a, 0)$ ima priključeni **samo palici P4 in P5** ter zunanjo silo $F_0 \downarrow$. Smeri palic stran od vozlišča:

$$\text{P4: } \tfrac{1}{\sqrt{2}}(-1,1), \qquad \text{P5: } \tfrac{1}{\sqrt{2}}(1,1).$$

  $\sum F_x = 0$**:**

$$-\frac{S_4}{\sqrt{2}} + \frac{S_5}{\sqrt{2}} = 0 \implies S_4 = S_5.$$

  $\sum F_y = 0$**:**

$$\frac{S_4}{\sqrt{2}} + \frac{S_5}{\sqrt{2}} - F_0 = 0 \implies \frac{2S_4}{\sqrt{2}} = F_0.$$

$$\boxed{S_4 = S_5 = \frac{\sqrt{2}}{2} F_0 \quad \text{(nateg).}}$$

- **Sile palic 1, 2, 3**
  Metoda prerezov – prerez med $x = 5a$ in $x = 6a$, skozi palice P1, P2, P3.
  Na **desni strani** prereza delujeta:
  - $\vec{S}_5$ vleče desni del proti $(6a, 0)$: $\vec{S}_5 = \frac{\sqrt{2}}{2} F_0 \cdot \frac{(-1,-1)}{\sqrt{2}} = F_0\left(-\frac{1}{2}, -\frac{1}{2}\right)$ v prijemališču $(7a, a)$,
  - $\vec{R}_B = F_0(-2,\, 2)$ v $(9a, a)$.

  Sile prerezanih palic delujejo na desni del (nateg = kaže levo):
  - P1: $S_1(-1, 0)$ v $(6a, a)$,
  - P2: $S_2 \dfrac{(-1,-1)}{\sqrt{2}}$ v $(6a, 2a)$,
  - P3: $S_3(-1, 0)$ v $(6a, 2a)$.

  $\sum F_y = 0$

$$-\frac{S_2}{\sqrt{2}} - \frac{F_0}{2} + 2F_0 = 0 \qquad \implies \qquad \boxed{S_2 = \frac{3\sqrt{2}}{2} F_0 \quad \text{(nateg).}}$$

- $\sum M_{(6a,\,2a)} = 0$ – izničimo S_2 in S_3
  Momenti okrog $(6a, 2a)$:

$$\begin{aligned} S_1(-1,0) \text{ v } (6a,a): &\quad M = -(a-2a)(-S_1) = -aS_1, \\ \vec{S}_5 \text{ v } (7a,a): &\quad M = (7a-6a)\left(-\tfrac{F_0}{2}\right) - (a-2a)\left(-\tfrac{F_0}{2}\right) = -\tfrac{aF_0}{2} - \tfrac{aF_0}{2} = -aF_0, \\ \vec{R}_B \text{ v } (9a,a): &\quad M = (9a-6a)\cdot 2F_0 - (a-2a)(-2F_0) = 6aF_0 - 2aF_0 = 4aF_0. \end{aligned}$$

$$-aS_1 - aF_0 + 4aF_0 = 0 \qquad \implies \qquad \boxed{S_1 = 3F_0 \quad \text{(nateg).}}$$

- $\sum M_{(6a,\,a)} = 0$ – izničimo S_1
  Momenti okrog $(6a, a)$:

$$\begin{aligned} S_2\frac{(-1,-1)}{\sqrt{2}} \text{ v } (6a,2a): &\quad M = -(2a-a)\left(-\tfrac{S_2}{\sqrt{2}}\right) = \frac{aS_2}{\sqrt{2}} = \frac{3aF_0}{2}, \\ S_3(-1,0) \text{ v } (6a,2a): &\quad M = -(2a-a)(-S_3) = aS_3, \\ \vec{S}_5 \text{ v } (7a,a): &\quad M = (7a-6a)\left(-\tfrac{F_0}{2}\right) - (a-a)\left(-\tfrac{F_0}{2}\right) = -\tfrac{aF_0}{2}, \\ \vec{R}_B \text{ v } (9a,a): &\quad M = (9a-6a)\cdot 2F_0 - (a-a)(-2F_0) = 6aF_0. \end{aligned}$$

$$\frac{3aF_0}{2} + aS_3 - \frac{aF_0}{2} + 6aF_0 = 0 \qquad \implies \qquad \boxed{S_3 = -7F_0 \quad \text{(tlak).}}$$

- Preveritev $\sum F_x = 0$:

$$-S_1 - \frac{S_2}{\sqrt{2}} - S_3 - \frac{F_0}{2} - 2F_0 = -3F_0 - \frac{3F_0}{2} + 7F_0 - \frac{F_0}{2} - 2F_0 = 0 \quad \checkmark$$

- **Povzetek**

$$\boxed{A_x = 2F_0, \qquad A_y = 3F_0, \qquad R_B = 2\sqrt{2}\,F_0.}$$

Palica	Sila	Vrsta
1	$3F_0$	nateg
2	$\frac{3\sqrt{2}}{2}F_0$	nateg
3	$-7F_0$	tlak
4	$\frac{\sqrt{2}}{2}F_0$	nateg
5	$\frac{\sqrt{2}}{2}F_0$	nateg

4. **Četrta naloga**

- **Geometrija in podatki**
  - Levi konec (prost): $x = 0$
  - Leva podpora A: $x = l/4$
  - Desna podpora B: $x = 3l/4$
  - Desni konec (prost): $x = l$
  - Enakomerna porazdeljena obtežba q_0 od $x = 0$ do $x = 3l/4$
  - Točkovna sila $F = q_0 l/2$ navzdol pri $x = l$
- **Sili podpor**
  $\sum M_A = 0$ (okrog $x = l/4$):

$$+\frac{q_0 l}{4}\cdot\frac{l}{8} - \frac{q_0 l}{2}\cdot\frac{l}{4} - \frac{q_0 l}{2}\cdot\frac{3l}{4} + B_y\cdot\frac{l}{2} = 0,$$
$$\frac{q_0 l^2}{32} - \frac{q_0 l^2}{8} - \frac{3q_0 l^2}{8} + B_y\cdot\frac{l}{2} = 0,$$
$$B_y\cdot\frac{l}{2} = \frac{q_0 l^2}{32} + \frac{4q_0 l^2}{32} + \frac{12q_0 l^2}{32} = \frac{15q_0 l^2}{32}.$$

$$\boxed{B_y = \frac{15q_0 l}{16}.}$$

  $\sum F_y = 0$**:**

$$A_y + B_y = q_0\cdot\frac{3l}{4} + \frac{q_0 l}{2} = \frac{5q_0 l}{4},$$
$$A_y = \frac{5q_0 l}{4} - \frac{15q_0 l}{16} = \frac{20q_0 l - 15q_0 l}{16}.$$

$$\boxed{A_y = \frac{5q_0 l}{16}.}$$

  Preveritev $\sum M_B = 0$:

$$-A_y\cdot\frac{l}{2} + q_0\cdot\frac{3l}{4}\cdot\frac{3l}{8} - F\cdot\frac{l}{4} = -\frac{5q_0 l^2}{32} + \frac{9q_0 l^2}{32} - \frac{4q_0 l^2}{32} = 0 \quad \checkmark$$

- **Prečna sila** $Q(x)$

  Območje 1: $0 \le x \le \dfrac{l}{4}$

  $$\boxed{Q(x) = -q_0\, x.}$$

  - $x = 0$: $Q = 0$
  - $x = \dfrac{l}{4}^{-}$: $Q = -\dfrac{q_0 l}{4}$

  Območje 2: $\dfrac{l}{4} \le x \le \dfrac{3l}{4}$

  $$\boxed{Q(x) = -q_0\, x + \frac{5q_0 l}{16}.}$$

  - $x = \dfrac{l}{4}^{+}$: $Q = -\dfrac{4q_0 l}{16} + \dfrac{5q_0 l}{16} = \dfrac{q_0 l}{16}$ (skok za A_y ✓)
  - Ničla: $x_0 = \dfrac{5l}{16}$
  - $x = \dfrac{3l}{4}^{-}$: $Q = -\dfrac{12q_0 l}{16} + \dfrac{5q_0 l}{16} = -\dfrac{7q_0 l}{16}$

  Območje 3: $\dfrac{3l}{4} \le x \le l$

  $$\boxed{Q(x) = \frac{q_0 l}{2}.}$$

  - $x = \dfrac{3l}{4}^{+}$: $Q = -\dfrac{7q_0 l}{16} + \dfrac{15q_0 l}{16} = \dfrac{q_0 l}{2}$ (skok za B_y ✓)
  - $x = l$: $Q = \dfrac{q_0 l}{2} = F$ ✓

- **Upogibni moment** $M(x)$

  Območje 1: $0 \le x \le \dfrac{l}{4}$

  $$\boxed{M(x) = -\frac{q_0\, x^2}{2}.}$$

  - $x = 0$: $M = 0$ ✓
  - $x = \dfrac{l}{4}$: $M = -\dfrac{q_0 l^2}{32}$

  Območje 2: $\dfrac{l}{4} \le x \le \dfrac{3l}{4}$

  $$\boxed{M(x) = -\frac{q_0\, x^2}{2} + \frac{5q_0 l}{16}\left(x - \frac{l}{4}\right).}$$

  - $x = \dfrac{l}{4}$: $M = -\dfrac{q_0 l^2}{32}$ ✓(zvezno)
  - Ekstrem pri $x_0 = \dfrac{5l}{16}$:

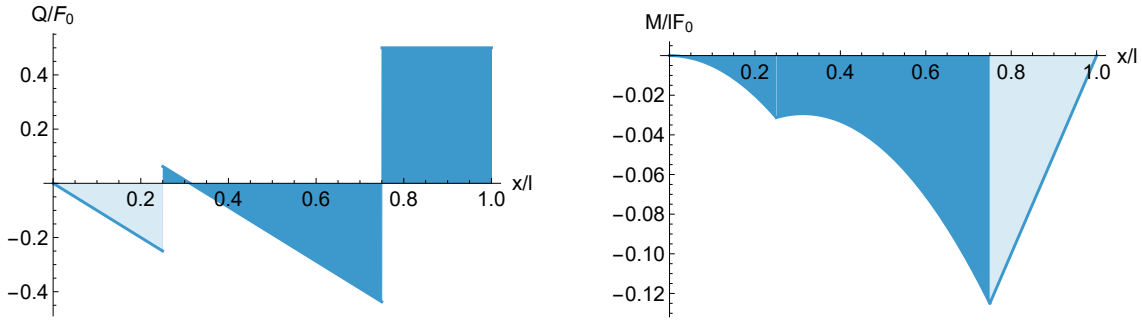
    $$M\left(\frac{5l}{16}\right) = -\frac{q_0}{2} \cdot \frac{25l^2}{256} + \frac{5q_0 l}{16} \cdot \frac{l}{16} = -\frac{25q_0 l^2}{512} + \frac{10q_0 l^2}{512} = -\frac{15q_0 l^2}{512}$$

  - $x = \dfrac{3l}{4}$:

    $$M = -\frac{9q_0 l^2}{32} + \frac{5q_0 l}{16} \cdot \frac{l}{2} = -\frac{9q_0 l^2}{32} + \frac{5q_0 l^2}{32} = -\frac{q_0 l^2}{8}$$

  Območje 3: $\dfrac{3l}{4} \le x \le l$

  $$\boxed{M(x) = -\frac{q_0 l}{2}(l - x).}$$



Slika 1: Potek prečne sile (levo) in upogibnega momenta (desno).

- $x = \dfrac{3l}{4}$: $M = -\dfrac{q_0 l}{2} \cdot \dfrac{l}{4} = -\dfrac{q_0 l^2}{8}$ ✓(zvezno)
- $x = l$: $M = 0$ ✓

- **Povzetek**

$$\boxed{A_y = \frac{5q_0 l}{16}, \qquad B_y = \frac{15q_0 l}{16}.}$$

Moment je povsod negativen (nosač se upogibi navzgor). Absolutni maksimum momenta nastopi pri desni podpori B:

$$|M|_{\max} = \frac{q_0 l^2}{8} \quad \text{pri } x = \frac{3l}{4}.$$