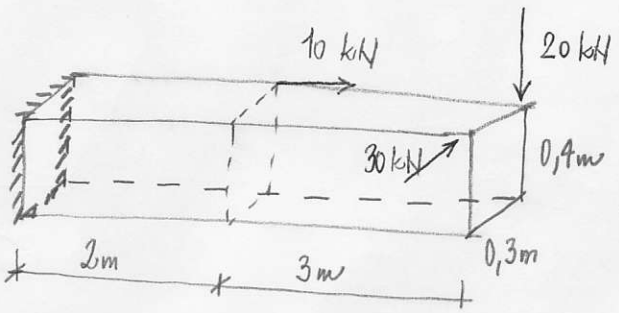
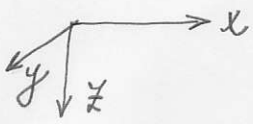
REAKCE PROSTOROVÉ KONZOLY

Př. 1 Reakce

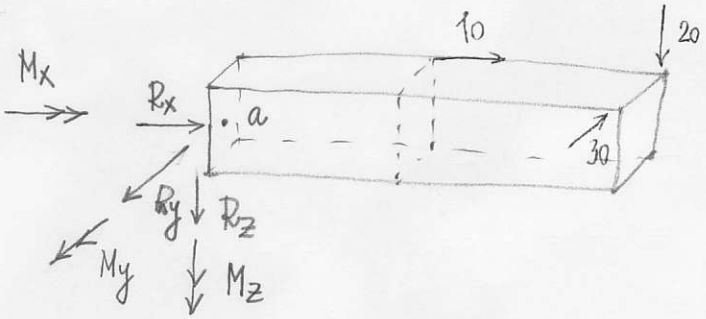




$m = 6$

$r = 6$

$s = m - r = 0$



$\rightarrow$ (x): $R_x + 10 = 0 \Rightarrow R_x = -10$ kN

$\swarrow$ (y): $R_y - 30 = 0 \Rightarrow R_y = 30$ kN

$\downarrow$ (z): $R_z + 20 = 0 \Rightarrow R_z = -20$ kN

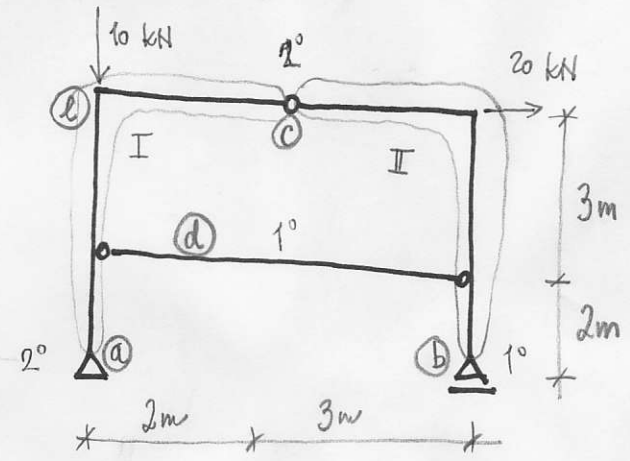
$\rightarrow\!\!\rightarrow$: $M_x + 10 \cdot 0 - 20 \cdot \frac{0,3}{2} - 30 \cdot \frac{0,4}{2} = 0 \Rightarrow M_x = 9$ kNm

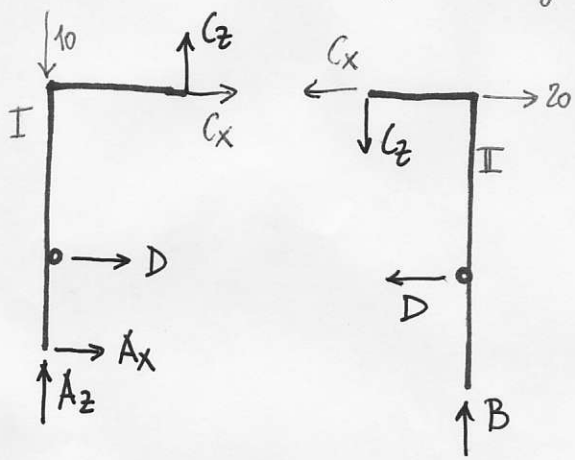
$\swarrow$: $M_y - 10 \cdot \frac{0,4}{2} - 20 \cdot 5 + 30 \cdot 0 = 0 \Rightarrow M_y = 102$ kNm

$\downarrow$: $M_z + 10 \cdot \frac{0,3}{2} + 20 \cdot 0 - 30 \cdot 5 = 0 \Rightarrow M_z = 148,5$ kNm

REAKCE SLOŽENÝCH SOUSTAV

Př. 2 Určete všechny vnější a vnitřní reakce složené soustavy. Výsledky zkontrolujte





$n = 2 \cdot 3 = 6$

$r = 2 + 2 + 1 + 1 = 6$

$s = m - r = 0$ ✓

$m_{vnější} = 3$

$r_{vnější} = 3$

$s_{vnější} = 3 - 3 = 0$ ✓

I+II: $\circlearrowleft_a$: $5B - 5\cdot 20 = 0 \Rightarrow B = 20$ kN (1)

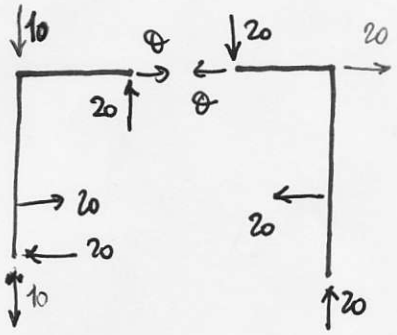
$\rightarrow$: $A_x + 20 = 0 \Rightarrow A_x = -20$ kN (2)

$\uparrow$: $A_z - 10 - B = 0 \Rightarrow A_z = 10$ kN (3)

II: $\circlearrowleft_c$: $-3D + 3B = 0 \Rightarrow D = B = 20$ kN (4)

$\rightarrow$: $-C_x + 20 - D = 0 \Rightarrow C_x = 0$ kN

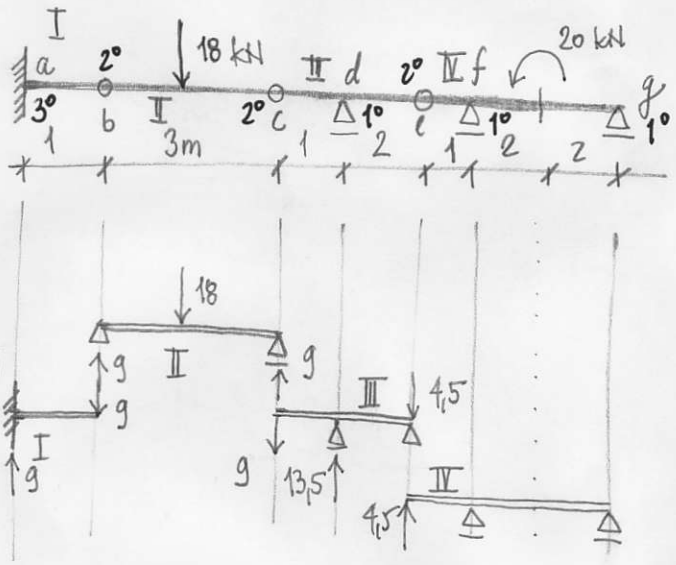
$\uparrow$: $-C_z + B = 0 \Rightarrow C_z = 20$ kN



Kontrola: $\circlearrowleft_e$: $C_z \cdot 2 + 3D + 5A_x = 0$

$2\cdot 20 + 3\cdot 20 - 5\cdot 20 = 0$ ✓

Př.: 3 Určete vnější a vnitřní reakce složené soustavy. Výsledky zkontrolujte.

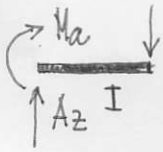


$m = 4\cdot 3 = 12$

$r = 3 + 3\cdot 2 + 3\cdot 1 = 12$

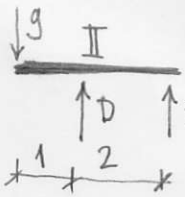
$S = m - r = 0$ ✓

- Gerberův nosník
- rozklad na nesené a nesoucí části
- začínám deskou II
- vodorovné reakce jsou 0



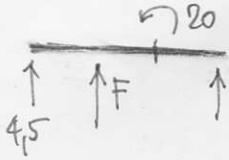
$\uparrow$: $A_z - g = 0 \Rightarrow A_z = g$ kN

$\circlearrowleft_a$: $-M_a - g = 0 \Rightarrow M_a = -g$ kNm



$\circlearrowleft_e$: $g\cdot 3 - 2D = 0 \Rightarrow D = 13{,}5$ kN

$\uparrow$: $-g - D + E = 0 \Rightarrow E = -4{,}5$ kN



$\circlearrowleft_g$: $-4{,}5\cdot 5 + 20 - 4F = 0 \Rightarrow F = -0{,}625$ kN

$\uparrow$: $4{,}5 + F + G = 0 \Rightarrow G = -3{,}875$

Kontrola: I+II+III+IV: $\circlearrowleft_a$: $+g - 18\cdot 2{,}5 + 13{,}5\cdot 5 - 0{,}625\cdot 8 - 3{,}875\cdot 12 + 20 = 0$ ✓