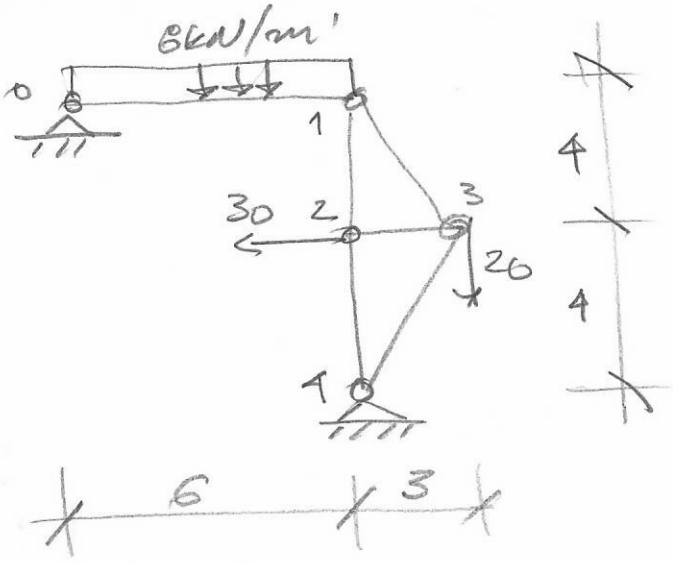
MEHANIKA I OTPORNOST MATERIJALA

PRVI KOLOKVIJUM 23.12.2020. god.

**GRUPA 1**

ZA NOSAČ I OPTEREĆENJE NA SKICI TREBA:



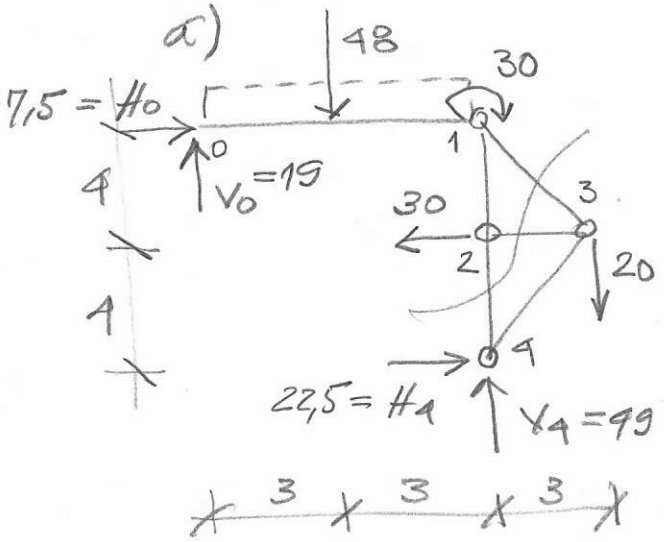

a) SRAČUNATI I NACRTATI REAKCIJE OSLONACA I SILE VEZA

b) NACRTATI DIJAGRAME SILA U PRESEKU (M, T, N)

c) ISPISATI ANALITIČKE IZRAZE ZA $M_x(z)$, $T_y(z)$, $N(z)$

d) SRAČUNATI SILE U ŠTAPOVIMA U NAZNAČENOM PRESEKU PO DVE METODE.

a)




$\curvearrowleft + \quad M_{1L} = 6V_0 - 3\cdot 48 + 30 = 0 \quad V_0 = 19\,kN$

$\curvearrowright + \quad M_{1d} = 8H_4 - 4\cdot 30 - 3\cdot 20 = 0 \quad H_4 = 22{,}5\,kN$

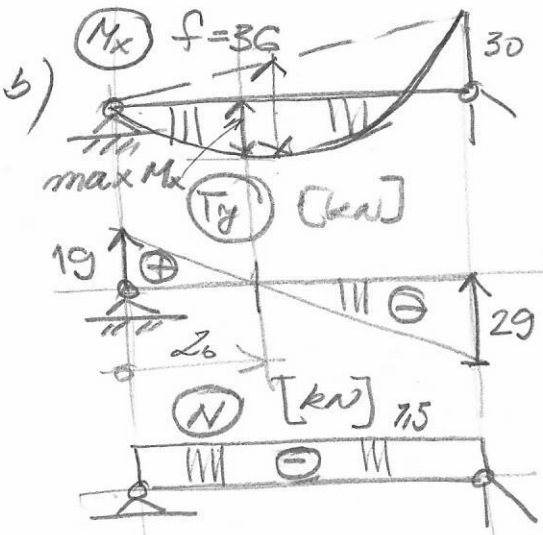
$\rightarrow \quad \Sigma H = H_0 + 22{,}5 - 30 = 0 \quad H_0 = 7{,}5\,kN$

$\uparrow + \quad \Sigma V = V_4 + 19 - 20 - 48 = 0 \quad V_4 = 49\,kN$

$V_1 = 48 - 19 = 29\,kN$

$H_1 = 7{,}5\,kN$

b)




$f = 8\cdot\frac{6^2}{8} = 36$

$\frac{z_0}{19} = \frac{6}{48} \rightarrow z_0 = 2{,}375\,m$

$\max M = 19\cdot z_0 - 8\cdot\frac{z_0^2}{2} = 22{,}56\,kNm$

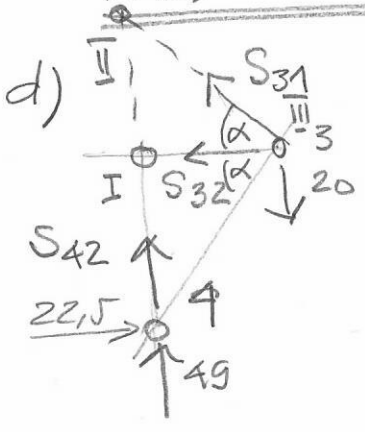
c) $M_x(z) = V_0\cdot z - p\cdot\frac{z^2}{2} = 19z - 8\cdot\frac{z^2}{2} = 19z - 4z^2$

$M_x(z) = 19z - 4z^2 \quad M_x(0) = 0 \quad M_x(6) = -30\,kNm$

$T_y(z) = 19 - 8z \quad T_y(0) = 19 \quad T_y(6) = -29\,kN$

$N(z) = -7{,}5$

d)




$\sin\alpha = 0{,}8$

$\cos\alpha = 0{,}6$

RITTER

$\curvearrowleft + \quad \Sigma M_I = 3S_{31}\sin\alpha - 3\cdot 20 + 4\cdot 22{,}5 = 0$

$S_{31} = -12{,}5\,kN$

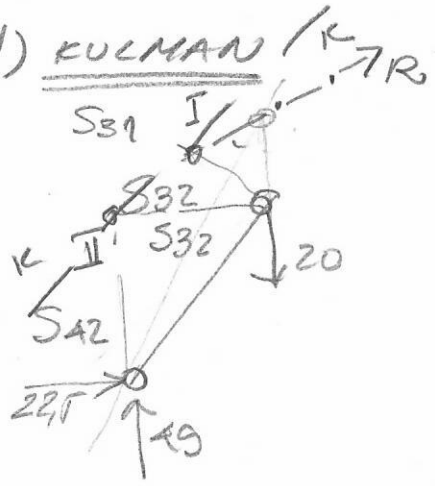
$\curvearrowright + \quad \Sigma M_{II} = 4S_{32} + 3\cdot 20 - 8\cdot 22{,}5 = 0$

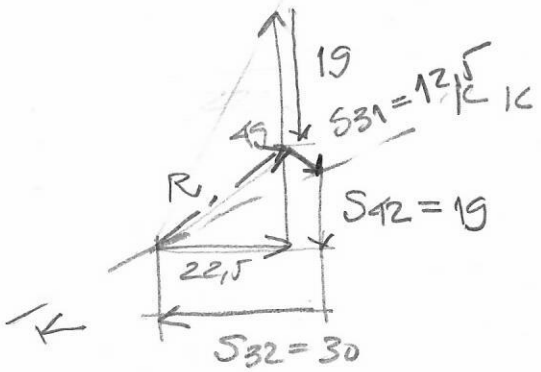
$S_{32} = 30\,kN$

$\curvearrowright + \quad \Sigma M_{III} = 3(S_{42} + 49) - 4\cdot 22{,}5 = 0$

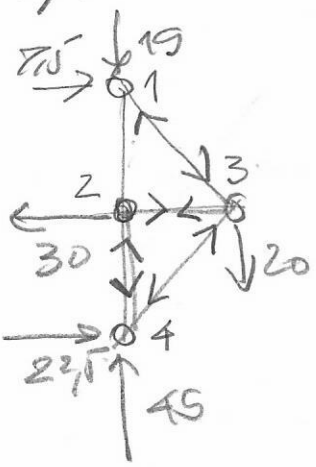
$S_{42} = -19\,kN$

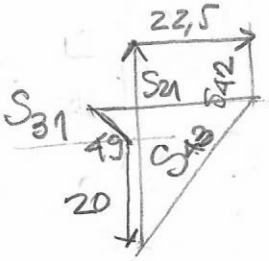
d) KULMAN




d) KREMONA




$S_{31} = -12{,}5$

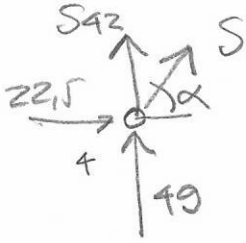
$S_{21} = 30$

$S_{42} = -19$

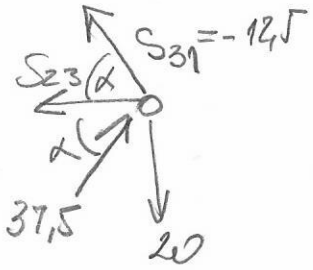
$S_{43} = -37{,}5$

d) ÖVOROVI

$\Sigma H = 22{,}5 + S_{43} \cdot 0{,}6 = 0 \qquad S_{43} = -37{,}5$




$\Sigma V = S_{42} + 19 - 37{,}5 \cdot 0{,}8 = 0 \qquad \underline{S_{42} = -19\,kN}$




$\Sigma V = (S_{31} + 37{,}5)\,0{,}8 - 20 = 0 \qquad \underline{S_{31} = -12{,}5\,kN}$

$\Sigma H = S_{23} - (37{,}5 + 12{,}5) \cdot 0{,}6 = 0 \qquad \underline{S_{23} = 30\,kN}$