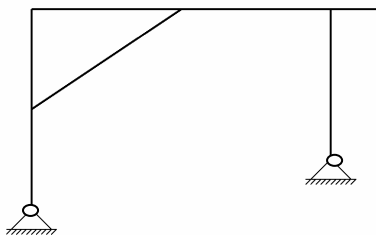


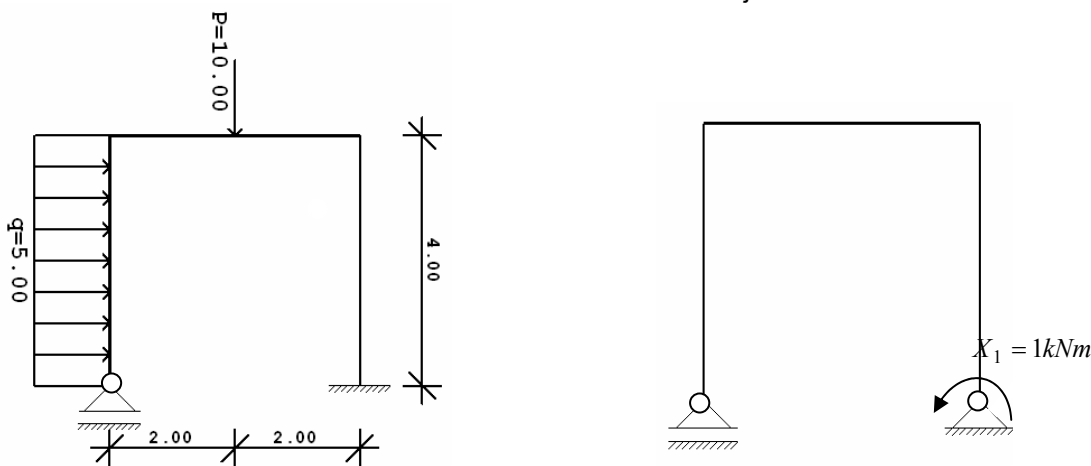
(ime i prezime, broj indeksa)

1. Odrediti stupanj statičke neodređenosti zadanog sustava te presijecanjem unutarnjih i vanjskih veza nacrtati dva statički određena sustava. (10 bodova)



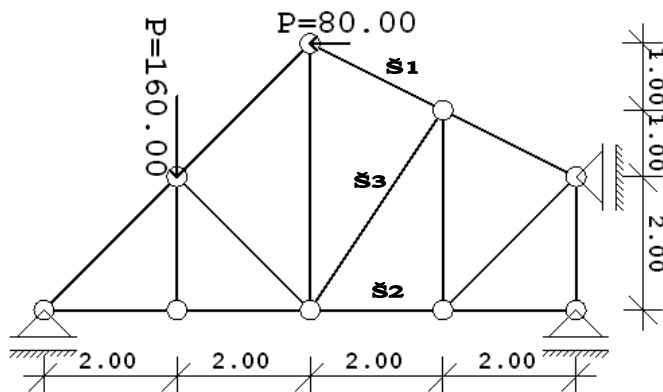
2. Za sustav na slici **METODOM SILA** odrediti dijagrame unutarnjih sila (M_k , T_k i N_k). Pri izračunu koeficijenta fleksibilnosti uzeti u obzir utjecaj **momenata savijanja** na deformiranje sustava. Dimenzije elemenata sustava su $b/h=20/30$ cm, $E=3.15 \cdot 10^7$ kN/m². (M_v , m_{1v})*8, (a_{1v} , a_{1v})*6, $X_1=4$, (M_k , T_k i N_k)*6 (50 bodova).

Za izračunavanje koristiti **zadani osnovni sustav**.

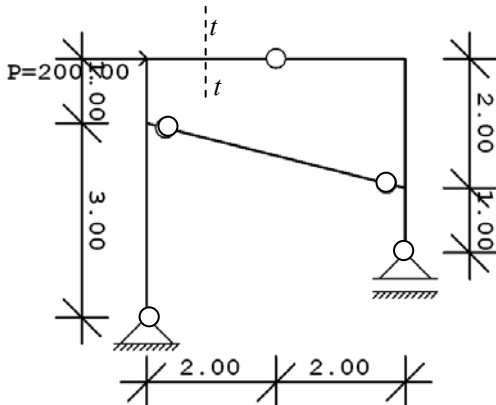


osnovni sustav za rješavanje

3. Odredite vrijednosti sila u označenim štapovima. (20 bodova)



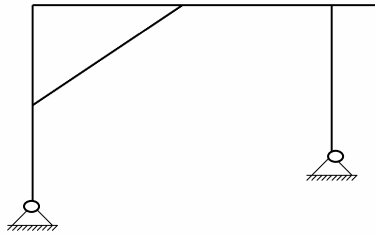
4. Grafički odredite sile u presjeku t-t M_{tt} , T_{tt} i N_{tt} (20 bodova)



Napomena: Na usmeni dio ispita može se pristupiti s 50 i više bodova iz pismenog dijela, ali pod uvjetom da iz 2.zadatka treba sakupiti najmanje 25 bodova.

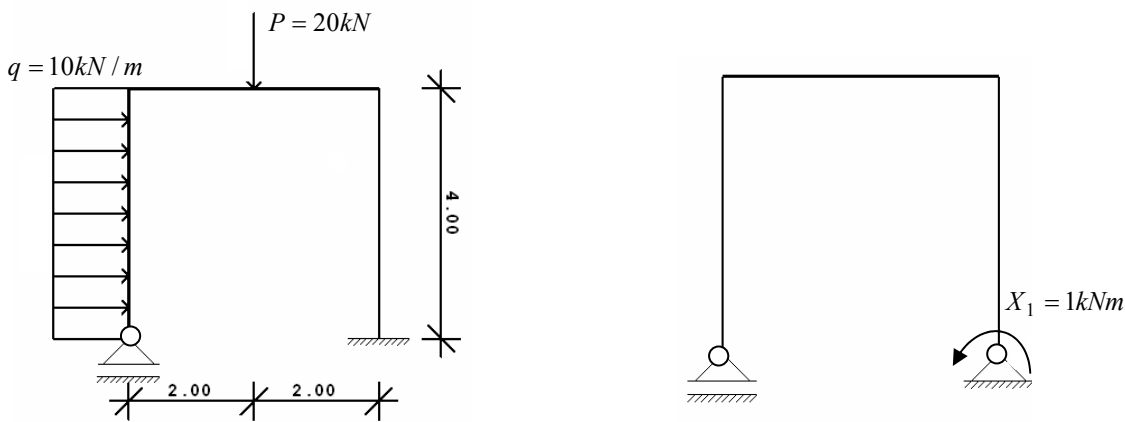
(ime i prezime, broj indeksa)

1. Odrediti stupanj statičke neodređenosti zadanog sustava te presijecanjem unutarnjih i vanjskih veza nacrtati dva statički određena sustava. (10 bodova)



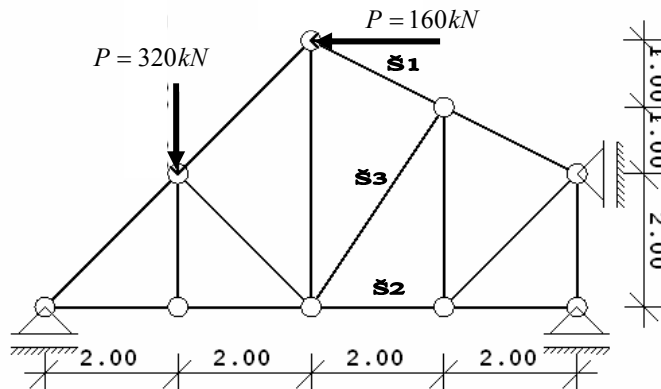
2. Za sustav na slici **METODOM SILA** odrediti dijagrame unutarnjih sila (M_k , T_k i N_k). Pri izračunu koeficijenta fleksibilnosti uzeti u obzir utjecaj **momenta savijanja** na deformiranje sustava. Dimenzije elemenata sustava su $b/h=20/30$ cm, $E=3.15 \cdot 10^7$ kN/m². (M_v , m_{1v})*8, (a_{11} , a_{1v})*6, $X_1=4$, (M_k , T_k i N_k)*6 (50 bodova).

Za izračunavanje koristiti **zadani osnovni sustav**.

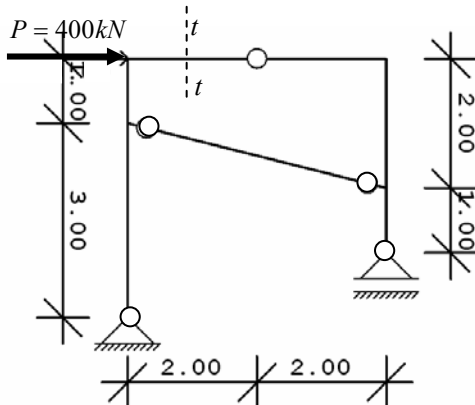


osnovni sustav za rješavanje

3. Odredite vrijednosti sila u označenim štapovima. (20 bodova)



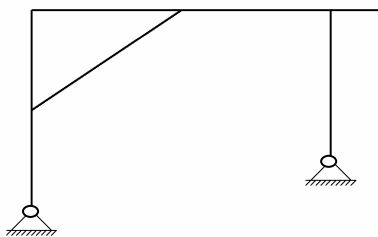
4. Grafički odredite sile u presjeku t-t M_{tt} , T_{tt} i N_{tt} (20 bodova)



Napomena: Na usmeni dio ispita može se pristupiti s 50 i više bodova iz pismenog dijela, ali pod uvjetom da iz 2.zadatka treba sakupiti najmanje 25 bodova.

PRORAČUN KONSTRUKCIJA –3. srpnja 2007.
RJEŠENJA

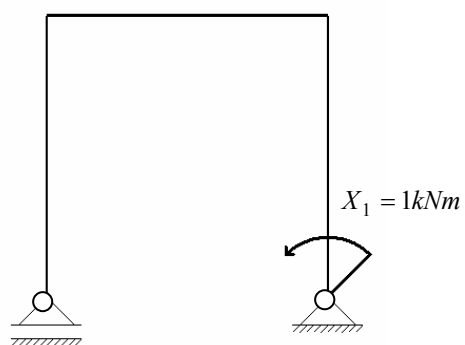
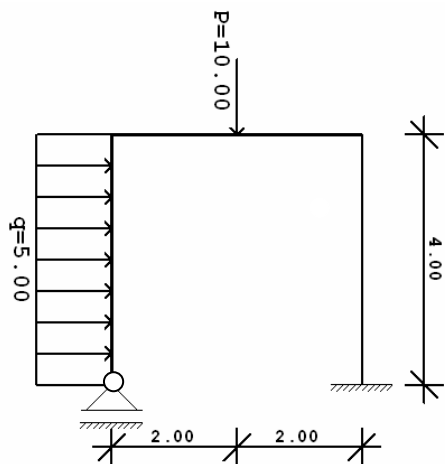
1. Neodređenost



4x neodređen

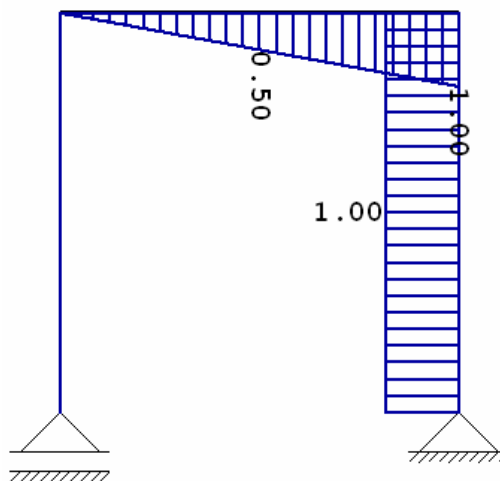
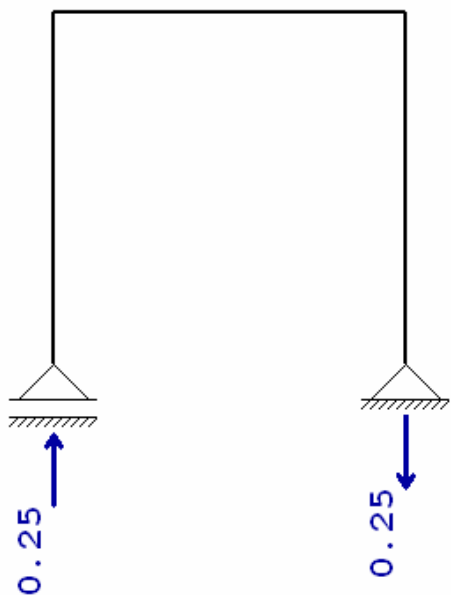
2. Metoda sila
zadani sustav

jedinično opterećenje na osnovnom sustavu

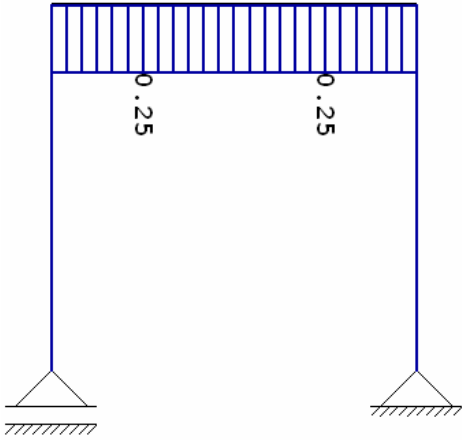


dijagrami na osnovnom sustavu
reakcije

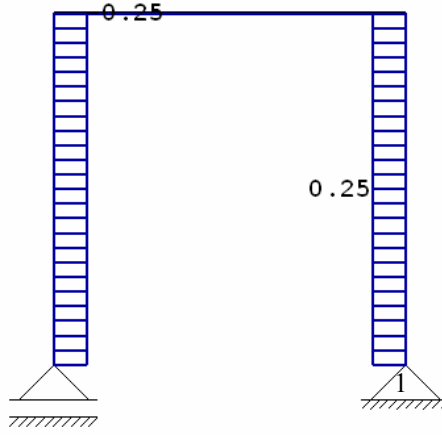
m1



t1



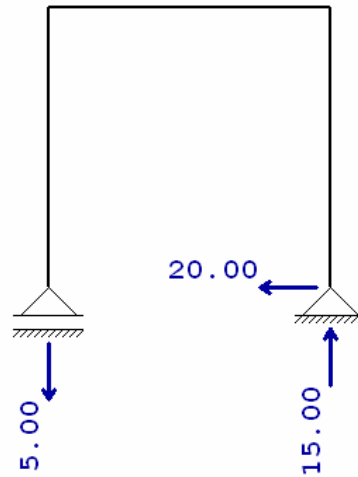
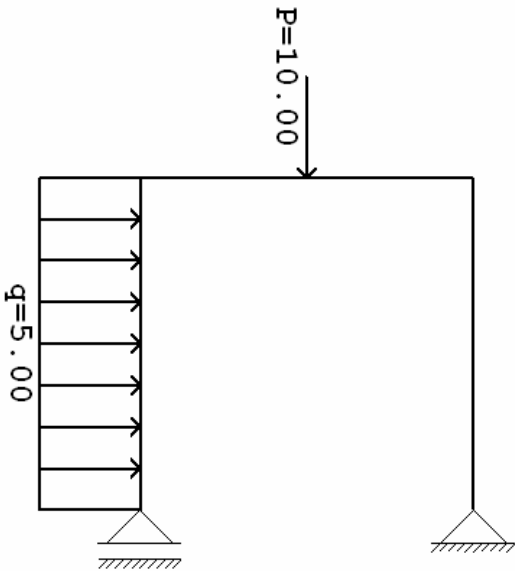
n1



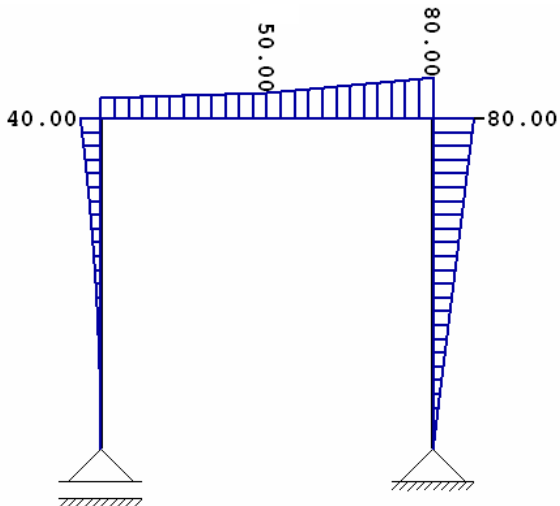
Napomena: dijagram poprečnih sila treba zrcaliti oko uzdužne osi svakog elementa tako da odgovara konvenciji koju smo naučili u Tehničkoj mehanici

VANJSKO OPTEREĆENJE

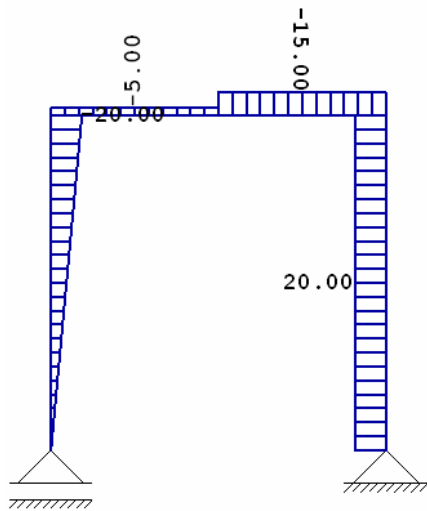
vanjsko opterećenje - reakcije



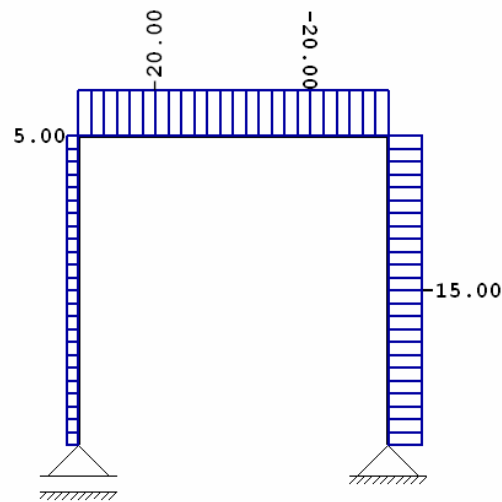
DIJAGRAMI UNUTARNJIH SILA ZA VANJSKO OPTEREĆENJE
Mv



Tv



Nv



Napomena: dijagram poprečnih sila treba zrcaliti oko uzdužne osi svakog elementa tako da odgovara konvenciji koju smo naučili u Tehničkoj mehanici

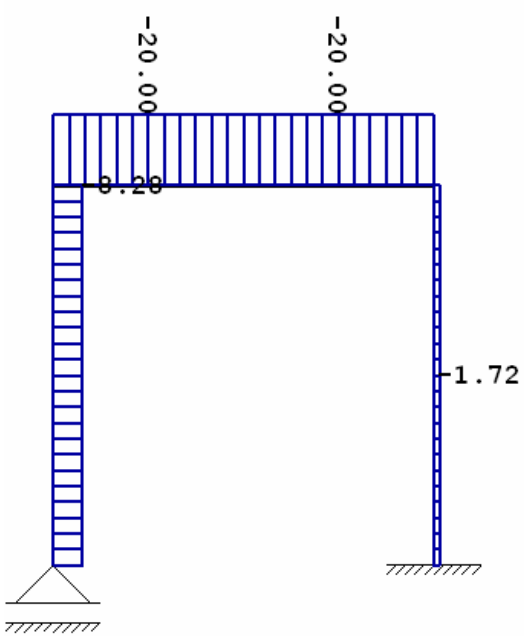
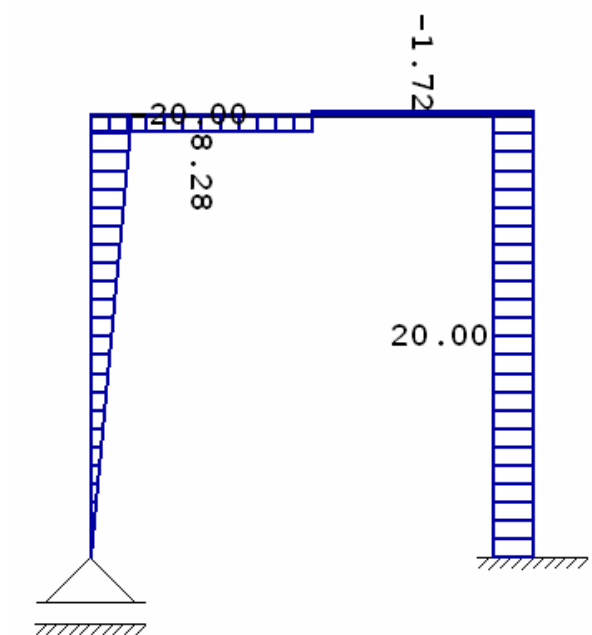
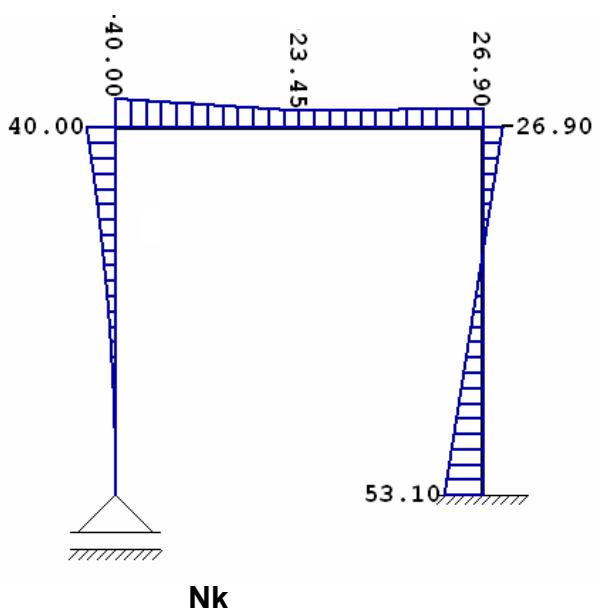
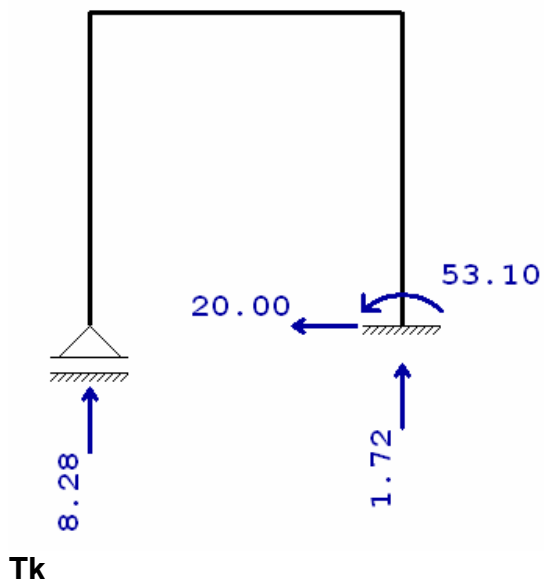
$$a_{11} = 5.33 / EI$$

$$a_{1v} = -283.33 / EI$$

$$X_1 = 53,10 \text{ kNm}$$

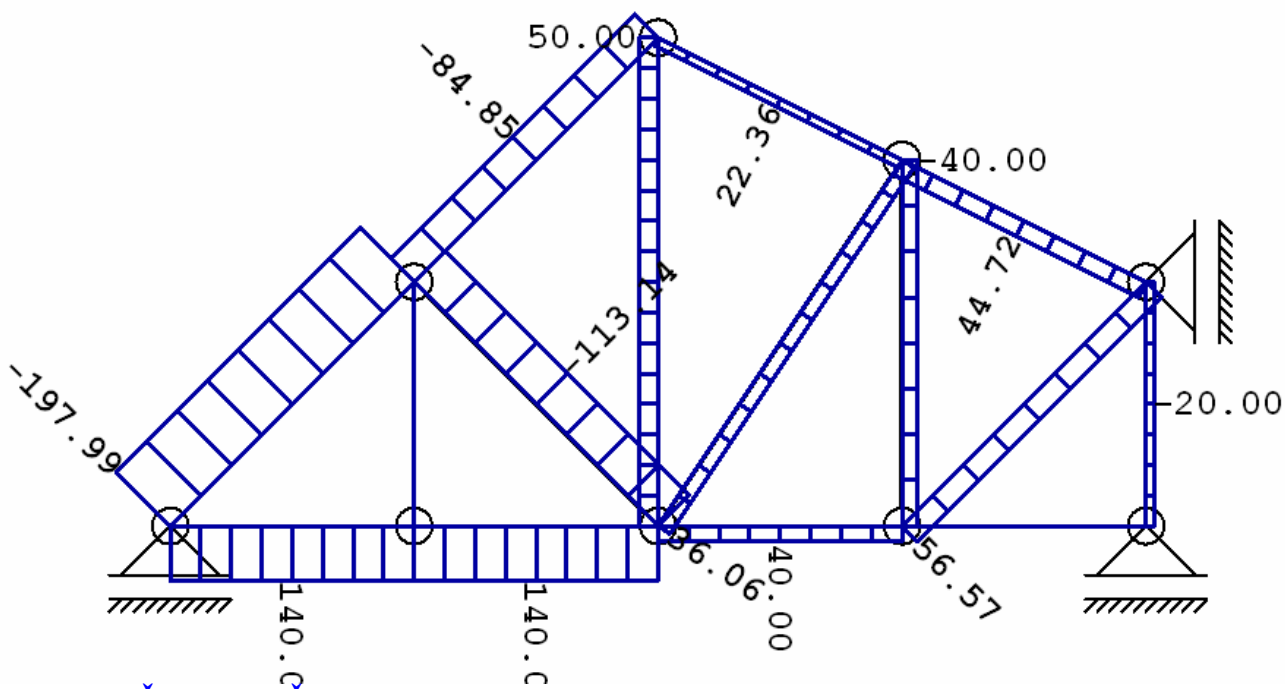
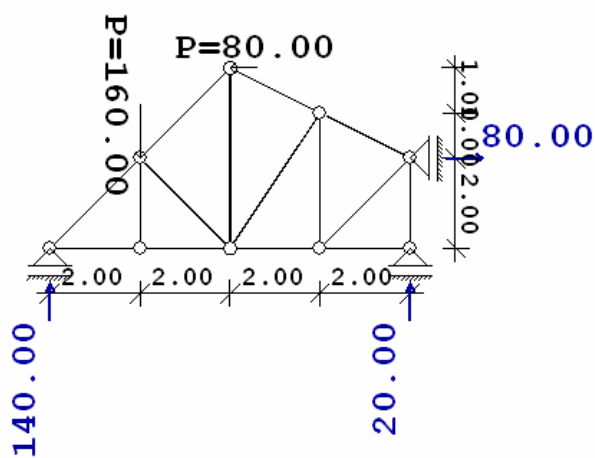
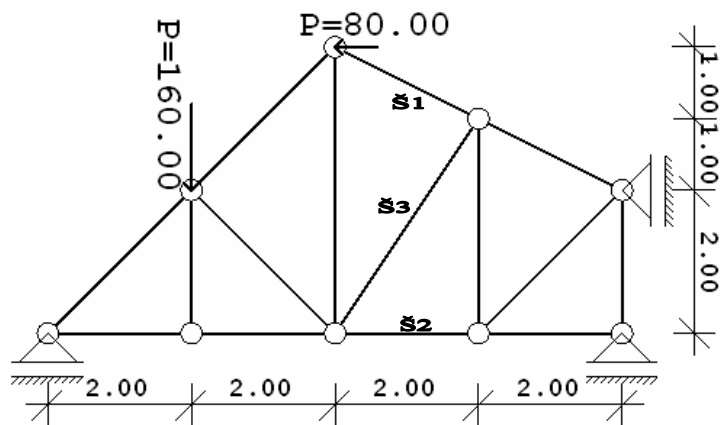
konačne reakcije na zadanom sustavu

KONAČNI DIJAGRAMI UNUTARNJIH SILA
Mk



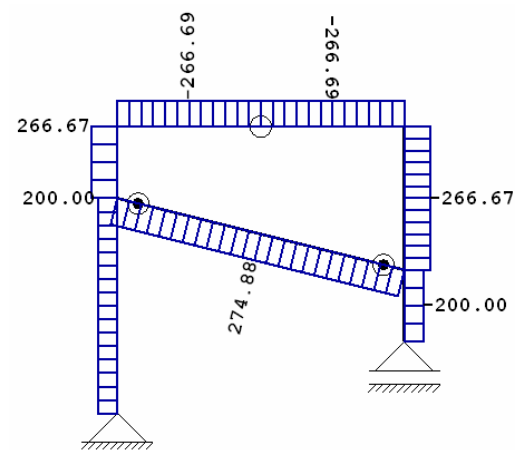
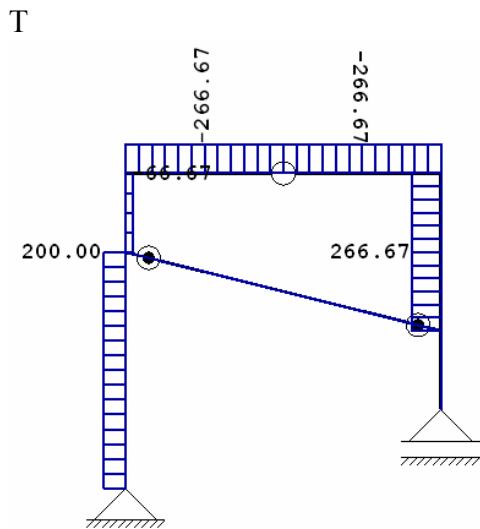
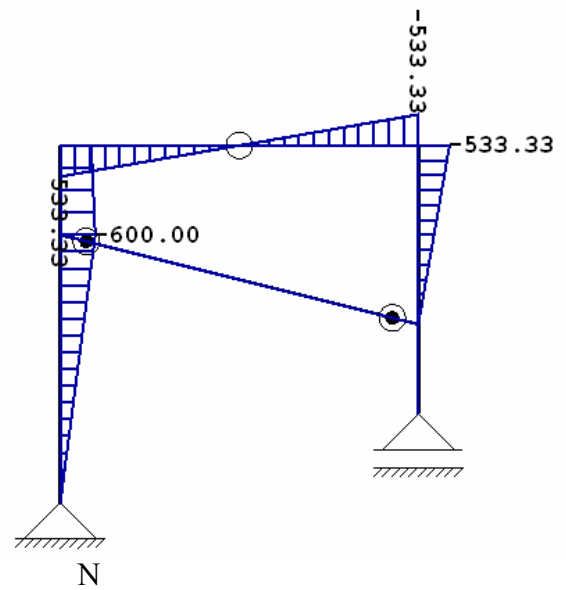
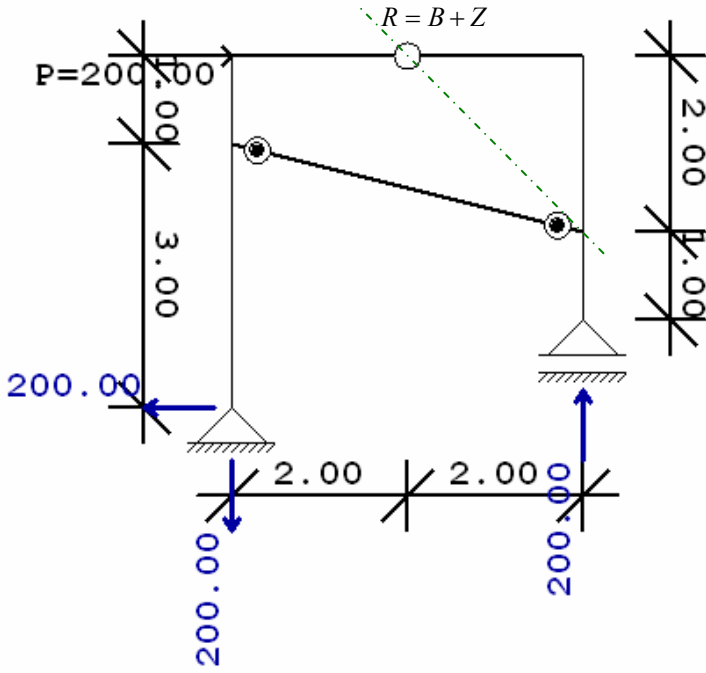
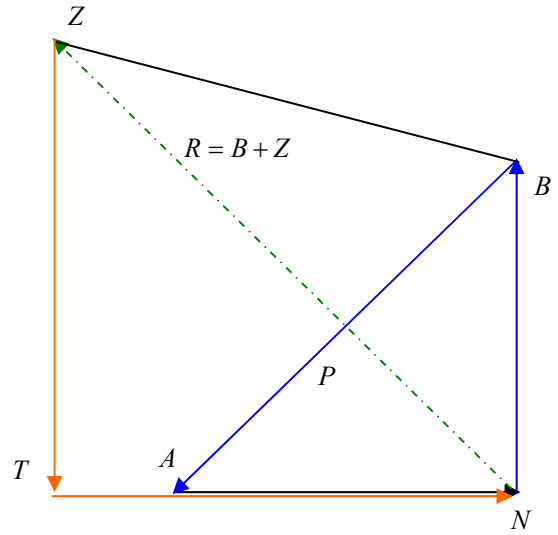
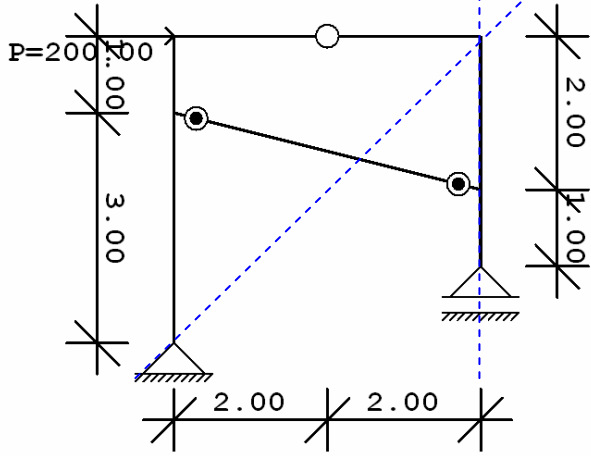
Napomena: dijagram poprečnih sila treba zrcaliti oko uzdužne osi svakog elementa tako da odgovara konvenciji koju smo naučili u Tehničkoj mehanici

3. Odredite vrijednosti sila u označenim štapovima



$\check{S}_1=22.4$ kN; $\check{S}_3=36$ kN $\check{S}_2=40$ kN

4. Grafički odredite sile u presjeku t-t M_{tt} , T_{tt} i N_{tt}



$M=266,7 \text{ kNm}$ $T=-266,7 \text{ kN}$ $N=-266,7 \text{ kN}$