**Karlsruher Institut für Technologie**
Institut für Baustatik
Prof. Dr.-Ing. habil. W. Wagner

# Nichtlineare Modellierung von Stabtragwerken
# Übungsblatt 1 - Lösungen

## Aufgabe 1

i)

| Profil I | Profil II | Profil II |
|---|---|---|
| $z_s = 4{,}02\,cm$ | $z_s = 4{,}02\,cm$ | $z_s = 3{,}82\,cm$ |
| $M_{el} = 1279{,}81\,kNcm$ | $M_{el} = 1536{,}75\,kNcm$ | $M_{el} = 1196{,}86\,kNcm$ |
| $M_{pl} = 1816{,}08\,kNcm$ | $M_{pl} = 2437{,}08\,kNcm$ | $M_{pl} = 1491{,}31\,kNcm$ |
| $\alpha_{pl} = 1{,}42$ | $\alpha_{pl} = 1{,}59$ | $\alpha_{pl} = 1{,}25$ |

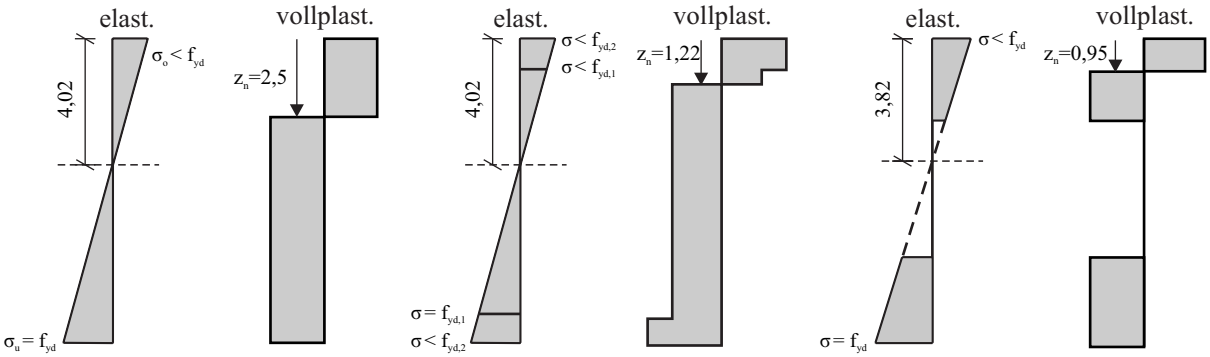



Abbildung 1: Spannungsverteilung im elast. und vollplast. Zustand der Profile I-III

ii)

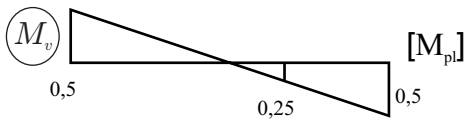
a)

$$\nu_{el} \cdot P = 11{,}38\,kN$$
$$\nu_{QR} \cdot P = 16{,}14\,kN$$
$$\nu_T \cdot P = 24{,}22\,kN$$

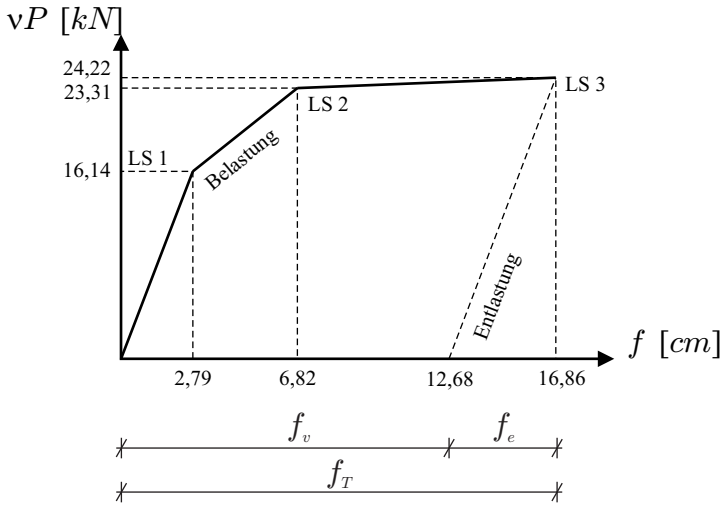
b)

$$f_T = 16{,}86\,cm$$

c)




$f_v = 12{,}68cm$



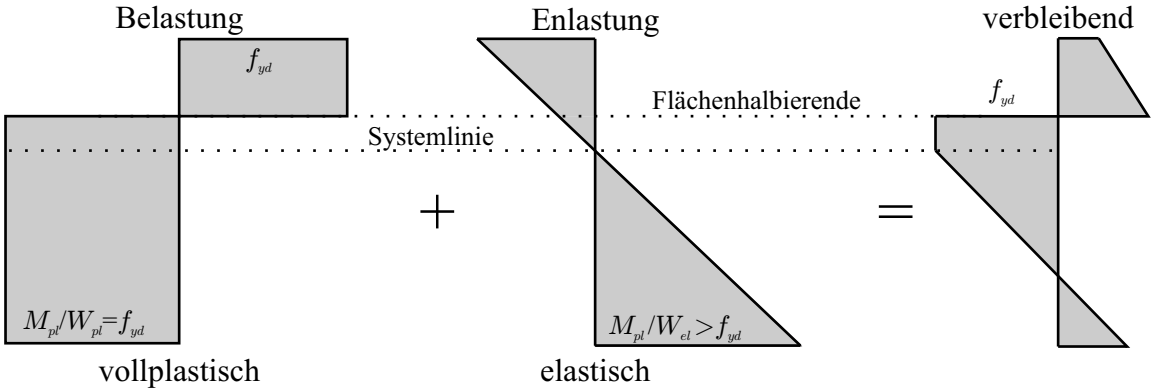



Abbildung 2: Qualitative Spannungsverteilung in Knoten 2 nach Entlastung.

iii)

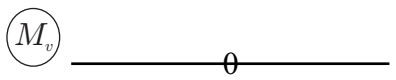
a)

$$\nu_{el} \cdot P = 12{,}8\,kN$$
$$\nu_{QR} \cdot P = 18{,}16\,kN$$
$$\nu_T \cdot P = 18{,}16\,kN$$

b)

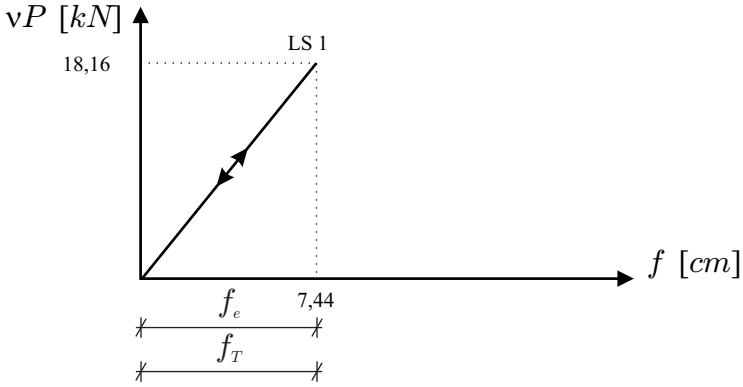
$$f_T = 7{,}44\,cm$$

c)




$f_v = 0\ cm$

Spannungsverlauf siehe ii)




iv)

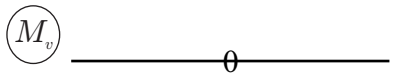
a)

$$\nu_{el} \cdot P = 1{,}6\,kN$$
$$\nu_{QR} \cdot P = 2{,}27\,kN$$
$$\nu_T \cdot P = 2{,}27\,kN$$

b)

$$f_T = 59{,}48\,cm$$

c)




$f_v = 0\ cm$

Spannungsverlauf siehe ii)