

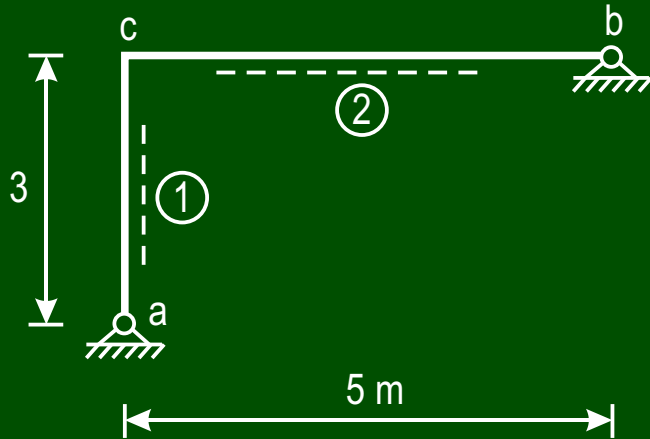
Diethard Thieme

Übungen

zur

Baustatik

BS 09



Kennwerte

$$J_1 = 400\,000 \text{ cm}^4 ; J_2 = 1,3 J_1$$

$$E_1 = E_2 = 3 \cdot 10^7 \text{ kN/m}^2$$

Stützensenkung: $\delta_b = 2 \text{ mm}$ nach unten

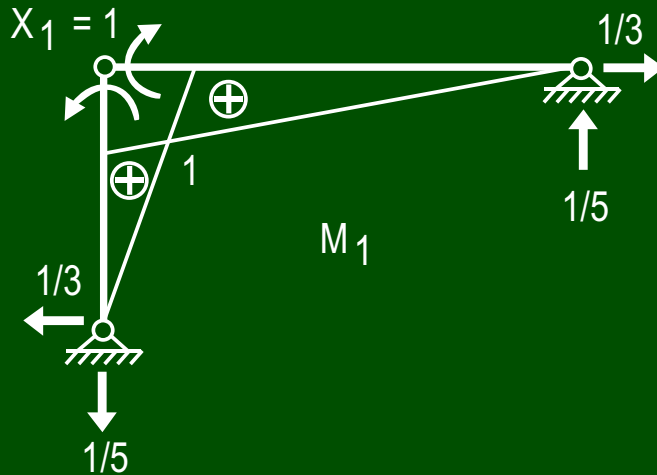
$$\text{Gewählt: } J_0 = J_2 ; E_0 = E_1$$

$$E_0 J_0 \delta_b = 312$$

Reduzierte Stablängen

$$L'_1 = 3 \frac{1}{1} \frac{1,3}{1} = 3,9 \text{ m}$$

$$L'_2 = 5 \text{ m}$$



$$a = E_0 J_0 1 \cdot \delta$$

Belastungszahl

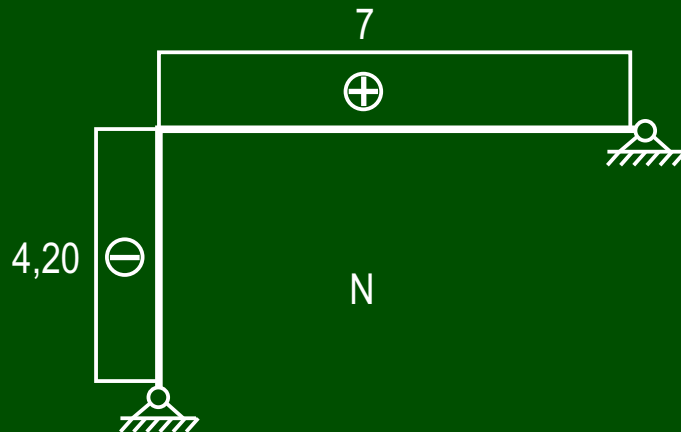
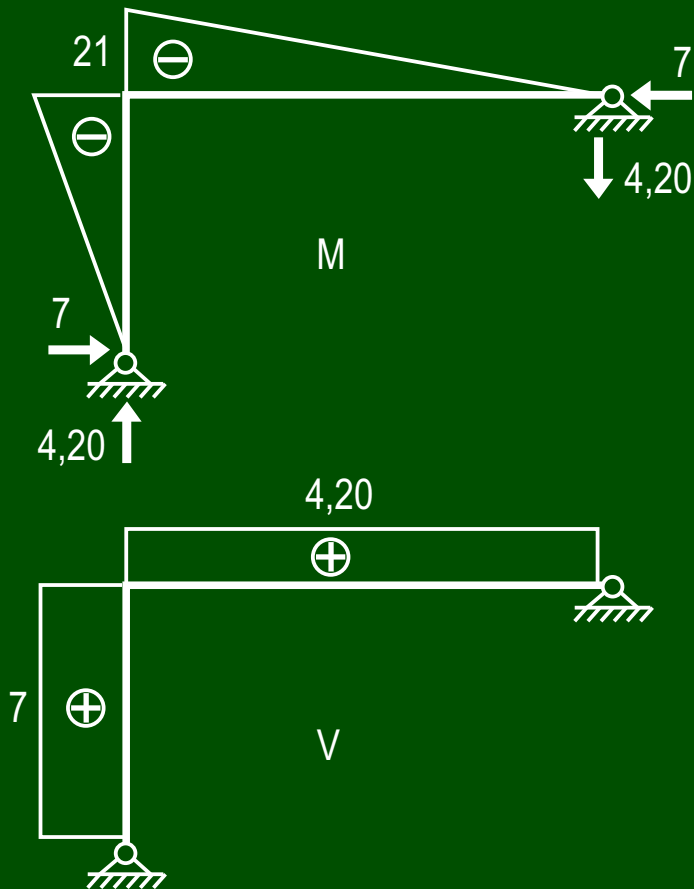
$$a_{10} = \frac{1}{5} 312 = 62,4$$

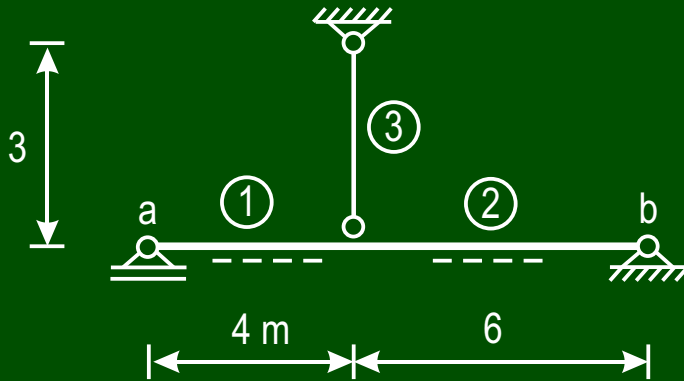
Vorzahl

$$a_{11} = 3,9 \frac{1}{3} 1 \cdot 1 + 5 \frac{1}{3} 1 \cdot 1 = 2,97$$

Gleichung

$$a_{11} X_1 = -a_{10} \text{ daraus } X_1 = -21$$





Kennwerte

$$J_1 = J_2 = 200\,000 \text{ cm}^4$$

$$E_1 = E_2 = 2,1 \cdot 10^7 \text{ kN/m}^2$$

$$A_3 = 4 \text{ cm}^2$$

$$E_3 = 2,1 \cdot 10^8 \text{ kN/m}^2$$

Stützensenkung: $\delta_a = 24 \text{ mm}$ nach unten

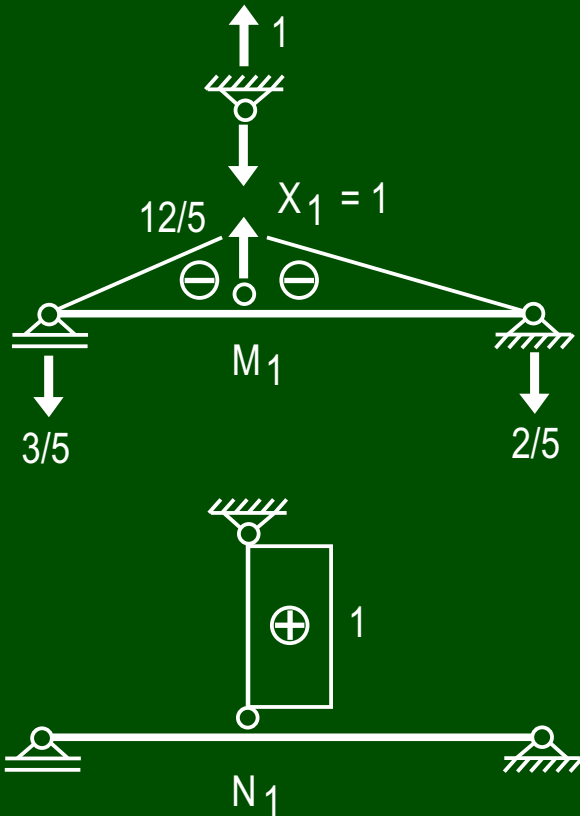
Gewählt: $J_0 = J_1$; $E_0 = E_1$

$$E_0 J_0 \delta_a = 1008$$

Reduzierte Stablängen

$$L'_1 = 4 \frac{1}{1} \frac{1}{1} = 4 \text{ m} \quad ; \quad L'_2 = 6 \text{ m}$$

$$L''_3 = 3 \frac{1}{10} \frac{0,002}{0,0004} = 1,5 \text{ m}^3$$



$$L'_1 = 4 \quad ; \quad L'_2 = 6 \quad ; \quad L''_3 = 1,5$$

$$a = E_0 J_0 1^* \delta$$

Belastungszahl

$$a_{10} = -\frac{3}{5} 1008 = -604,8$$

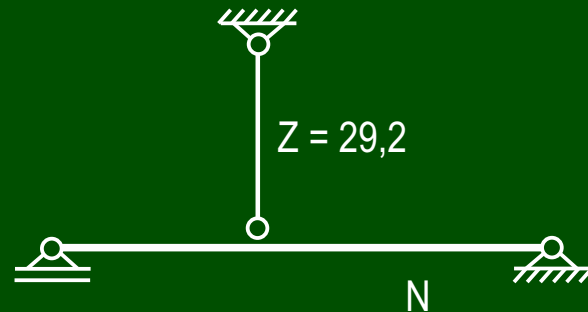
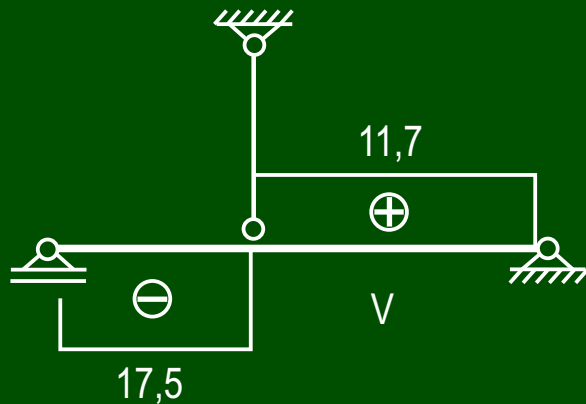
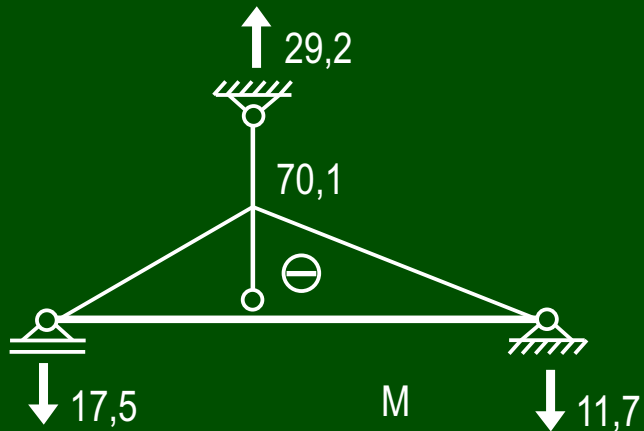
Vorzahl

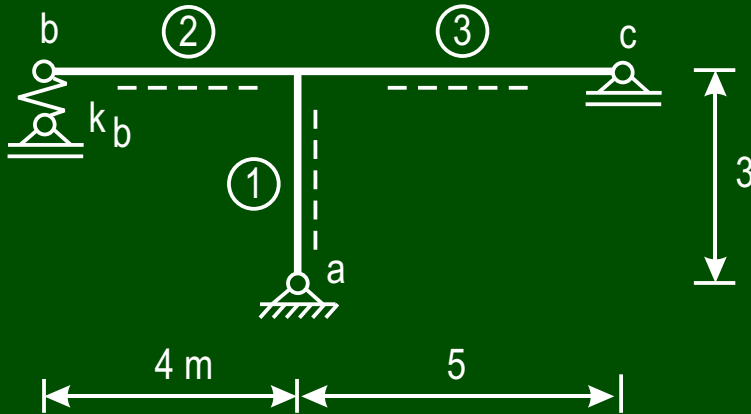
$$a_{11} = 4 \frac{1}{3} \left(-\frac{12}{5}\right) \left(-\frac{12}{5}\right) + 6 \frac{1}{3} \left(-\frac{12}{5}\right) \left(-\frac{12}{5}\right) + 1,5 \cdot 1 \cdot 1 = 20,7$$

aus N
in Stab 3

Gleichung

$$a_{11} X_1 = -a_{10} \quad \text{daraus} \quad X_1 = 29,2$$





Kennwerte

$$J_1 = 150\,000 \text{ cm}^4 ; J_2 = J_3 = 0,9 J_1$$

$$E_1 = E_2 = E_3 = 3 \cdot 10^7 \text{ kN/m}^2$$

$$k_b = 1,6 \text{ mm/kN}$$

$$\text{Stützensenkung: } \delta_a = 6 \text{ mm nach unten}$$

$$\text{Gewählt: } J_0 = J_1 ; E_0 = E_1$$

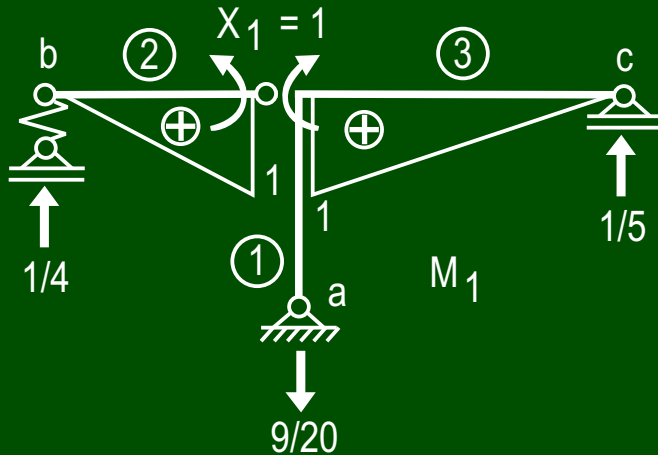
$$E_0 J_0 \delta_a = 270$$

$$E_0 J_0 k_b = 72$$

Reduzierte Stablängen

$$L'_1 = 3 \frac{1}{1} \frac{1}{1} = 3 \text{ m}$$

$$L'_2 = 4 \frac{1}{1} \frac{1}{0,9} = 4,44 \text{ m} ; L'_3 = 5,56 \text{ m}$$



$$L'_1 = 3 ; L'_2 = 4,44 ; L'_3 = 5,56$$

$$E_0 J_0 \delta_a = 270$$

$$E_0 J_0 k_b = 72$$

$$a = E_0 J_0 1^* \delta$$

Belastungszahl

$$a_{10} = -\frac{9}{20} 270 = -121,5$$

Vorzahl

$$a_{11} = 4,44 \frac{1}{3} 1 \cdot 1 + 5,56 \frac{1}{3} 1 \cdot 1 + \\ + \frac{1}{4} \frac{1}{4} 72 = 7,83$$

aus k_b

Gleichung

$$a_{11} X_1 = -a_{10} \text{ daraus } X_1 = 15,5$$

