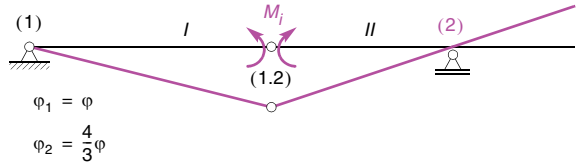
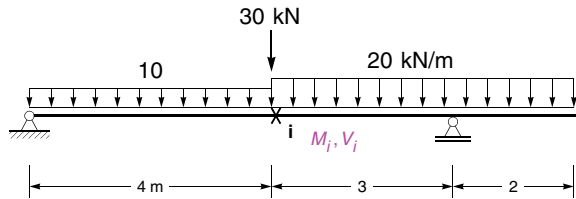
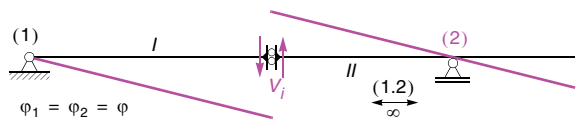


Aufgabe 1



$$\sum \bar{W} = 0: -M_i \cdot \varphi - M_i \cdot \frac{4}{3} \varphi + 10 \cdot 4 \cdot \varphi \cdot 2 + 20 \cdot 5 \cdot \frac{4}{3} \varphi \cdot 0.5 + 30 \cdot \varphi \cdot 4 = 0$$

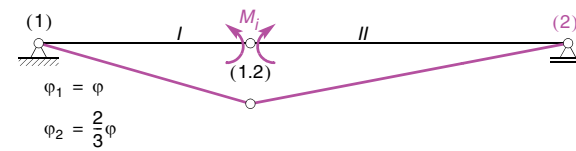
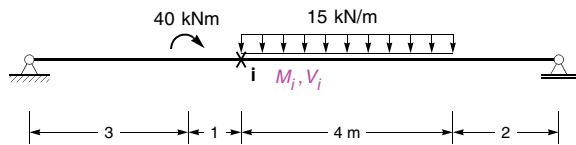
$$\Rightarrow M_i = 114.28571$$



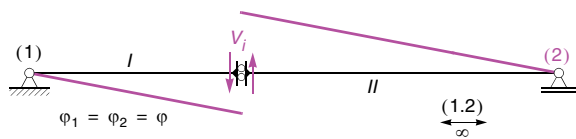
$$\sum \bar{W} = 0: V_i \cdot \varphi \cdot 4 + V_i \cdot \varphi \cdot 3 + 10 \cdot 4 \cdot \varphi \cdot 2 - 20 \cdot 5 \cdot \varphi \cdot 0.5 + 30 \cdot \varphi \cdot 4 = 0$$

$$\Rightarrow V_i = -21.428571$$

Aufgabe 2

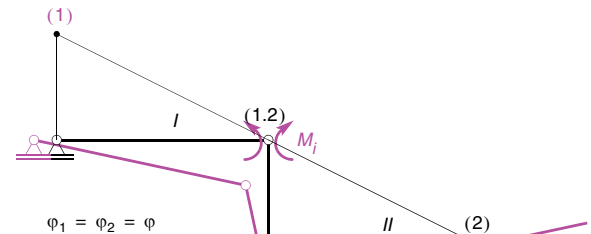
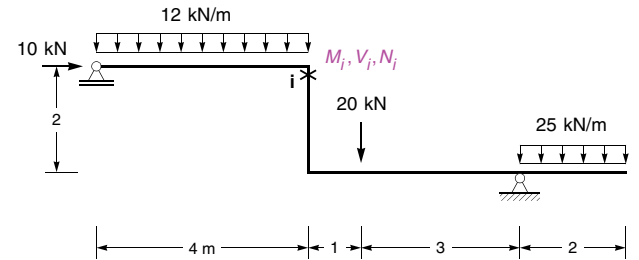


$$\sum \bar{W} = 0: -M_i \cdot \varphi - M_i \cdot \frac{2}{3} \varphi + 40 \cdot \varphi + 15 \cdot 4 \cdot \frac{2}{3} \varphi \cdot 4 = 0 \Rightarrow M_i = 120$$



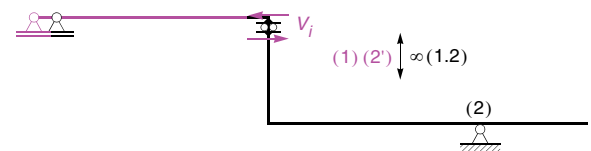
$$\sum \bar{W} = 0: V_i \cdot \varphi \cdot 4 + V_i \cdot \varphi \cdot 6 + 40 \cdot \varphi - 15 \cdot 4 \cdot \varphi \cdot 4 = 0 \Rightarrow V_i = 20$$

Aufgabe 3

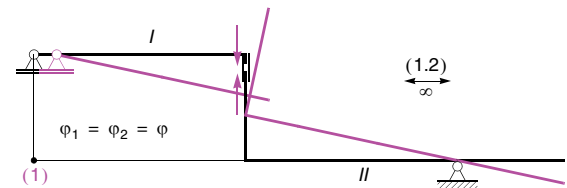


$$\sum \bar{W} = 0: -M_i \cdot \varphi - M_i \cdot \varphi + 12 \cdot 4 \cdot \varphi \cdot 2 - 10 \cdot \varphi \cdot 2 + 20 \cdot \varphi \cdot 3 - 25 \cdot 2 \cdot \varphi \cdot 1 = 0$$

$$\Rightarrow M_i = 43$$

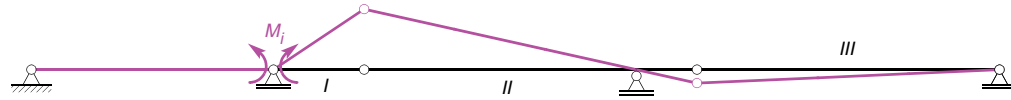
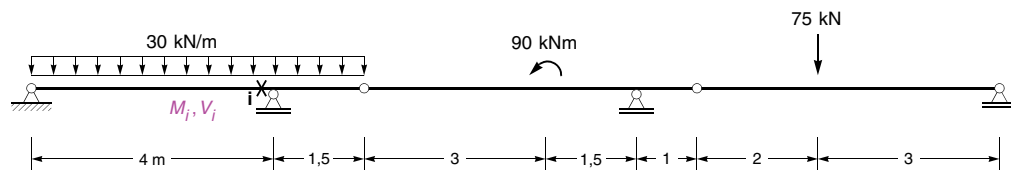


$$\sum \bar{W} = 0: V_i \cdot \delta - 10 \cdot \delta = 0 \Rightarrow V_i = 10$$



$$\sum \bar{W} = 0: N_i \cdot \varphi \cdot 4 + N_i \cdot \varphi \cdot 4 + 12 \cdot 4 \cdot \varphi \cdot 2 + 10 \cdot \varphi \cdot 2 - 20 \cdot \varphi \cdot 3 + 25 \cdot 2 \cdot \varphi \cdot 1 = 0 \Rightarrow N_i = -13.25$$

Aufgabe 4

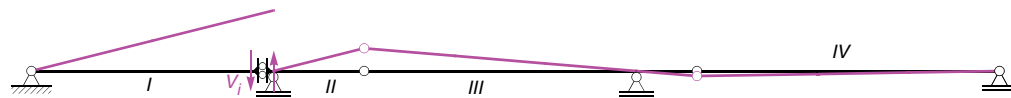


$$\varphi_1 = \varphi$$

$$\varphi_2 = \frac{1}{3}\varphi$$

$$\varphi_3 = \frac{1}{15}\varphi$$

$$\sum \bar{W} = 0: -M_i \cdot \varphi - 30 \cdot 1.5 \cdot \varphi \cdot 0.75 - 90 \cdot \frac{1}{3}\varphi + 75 \cdot \frac{1}{15}\varphi \cdot 3 = 0 \Rightarrow M_i = -48.75$$



$$\varphi_1 = \varphi_2 = \varphi$$

$$\varphi_3 = \frac{1}{3}\varphi$$

$$\varphi_4 = \frac{1}{15}\varphi$$

$$\sum \bar{W} = 0: -V_i \cdot \varphi \cdot 4 - 30 \cdot 4 \cdot \varphi \cdot 2 - 30 \cdot 1.5 \cdot \varphi \cdot 0.75 - 90 \cdot \frac{1}{3}\varphi + 75 \cdot \frac{1}{15}\varphi \cdot 3 = 0 \Rightarrow V_i = -72.1875$$