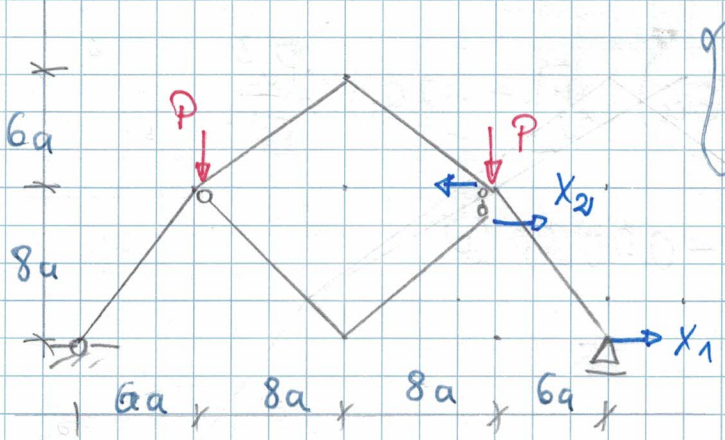
Kol 1.1. r.a. 2025/2026

USW



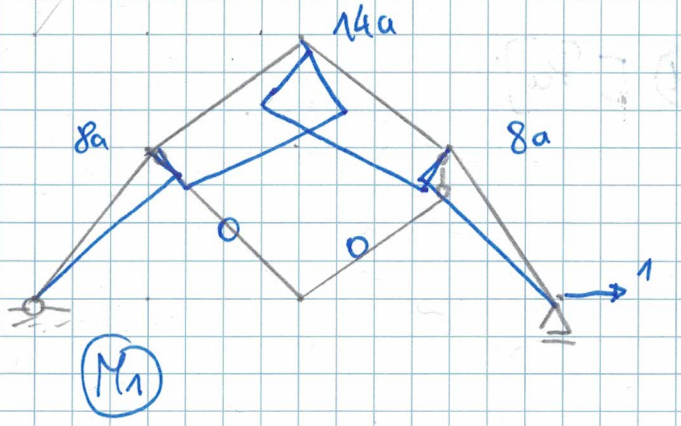
r-nia zgodności

$$\begin{cases} \delta_{11} X_1 + \delta_{12} X_2 + \delta_{10} = 0 \\ \delta_{21} X_1 + \delta_{22} X_2 + \delta_{20} = 0 \end{cases}$$

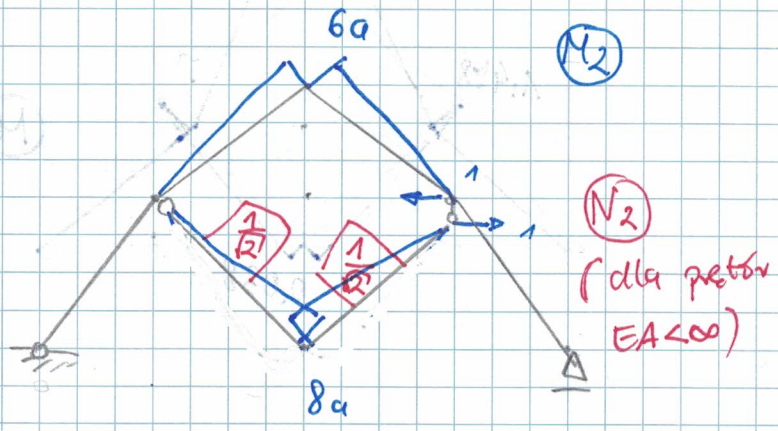
$EJ_s = \frac{1}{20} EJ$

$\frac{1}{EA_s} = \frac{1}{2} \frac{a^2}{EJ}$

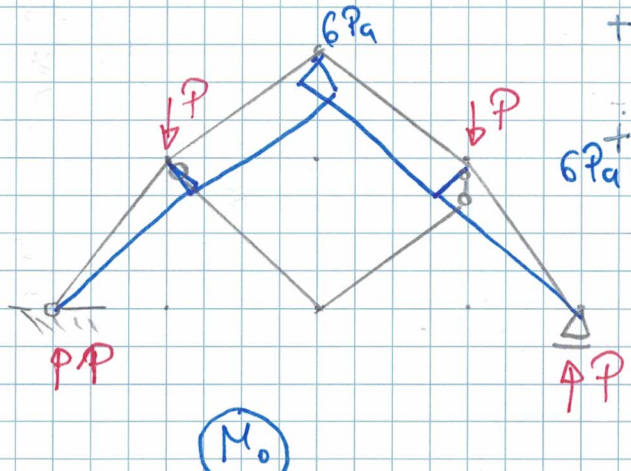
Stan $X_1 = 1$



Stan $X_2 = 1$



Stan „0"



$$\delta_{11} = \frac{1}{EJ}\left[\frac{1}{2} \cdot 8a \cdot 10a \cdot \frac{2}{3} 8a \cdot 2 + \frac{1}{2} 8a \cdot 10a \left(\frac{2}{3} 8a + \frac{1}{3} 14a\right) \cdot 2 + 67a \cdot 2 \cdot \frac{1}{2} 14a \cdot 10a \left(\frac{2}{3} 14a + \frac{1}{3} 8a\right)\right] = 2906{,}7 \frac{a^3}{EJ}$$

$$\delta_{12} = \frac{1}{EJ}\left[\frac{1}{2} 6a \cdot 10a \cdot \left(-\frac{1}{3} 8a - \frac{2}{3} 14a\right) \cdot 2\right] = -720 \frac{a^3}{EJ}$$

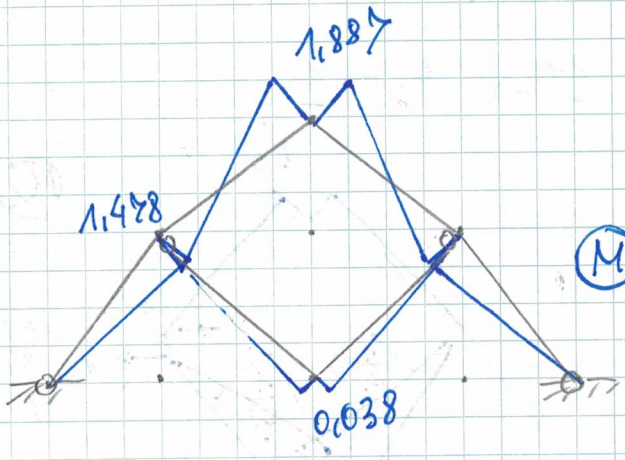
$$\delta_{22} = \frac{1}{EJ}\left[20 \cdot \frac{1}{2} 8a \cdot 8a \cdot \frac{2}{3} 8a \cdot 2 + \frac{1}{2} 6a \cdot 10a \cdot \frac{2}{3} 6a \cdot 2\right] + \frac{1}{2} \frac{a^2}{EJ}\left[\frac{1}{2} 8a \cdot \frac{1}{2} \cdot 2\right] = 3900{,}02 \frac{a^3}{EJ}$$

$$\delta_{10} = \frac{1}{EJ}\left[\frac{1}{2} \cdot 6Pa \cdot 10a \cdot \frac{2}{3} \cdot 8a \cdot 2 + 6Pa \cdot 10a \cdot \frac{1}{2}(8a + 14a) \cdot 2\right]$$

$$= 1640 \frac{Pa^3}{EJ}$$

$$\delta_{20} = \frac{1}{EJ}\left[6Pa \cdot 10a \cdot \left(-\frac{1}{2} \cdot 6a\right) \cdot 2\right] = -360 \frac{Pa^3}{EJ}$$

$$X_1 = -0{,}565P \qquad X_2 = -0{,}0048P$$



(M) [Pa]