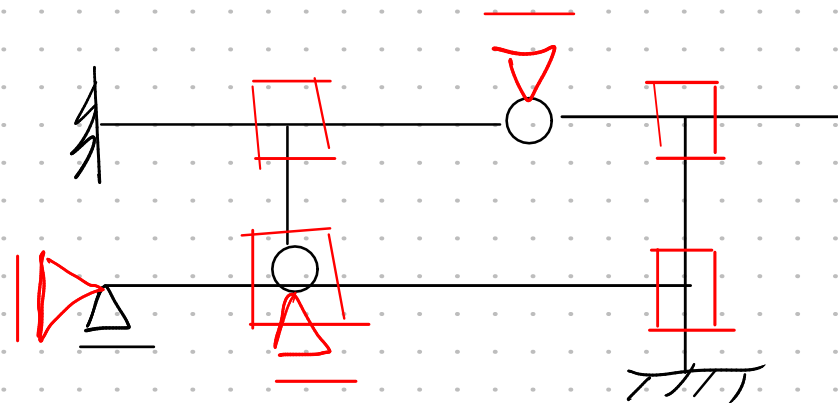


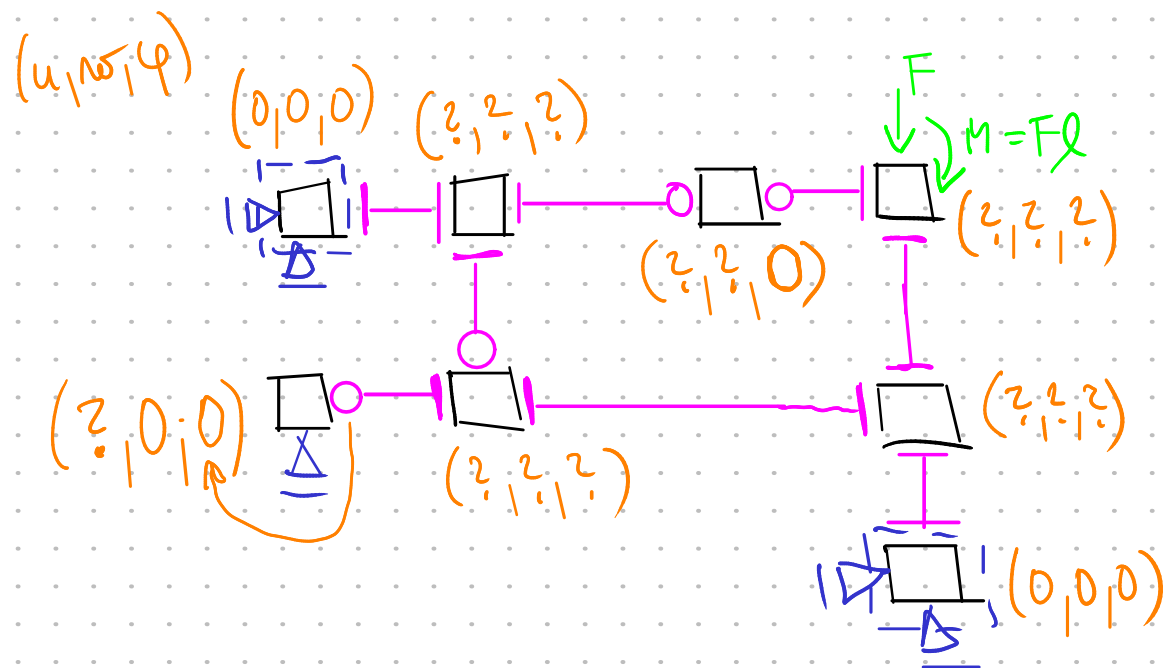


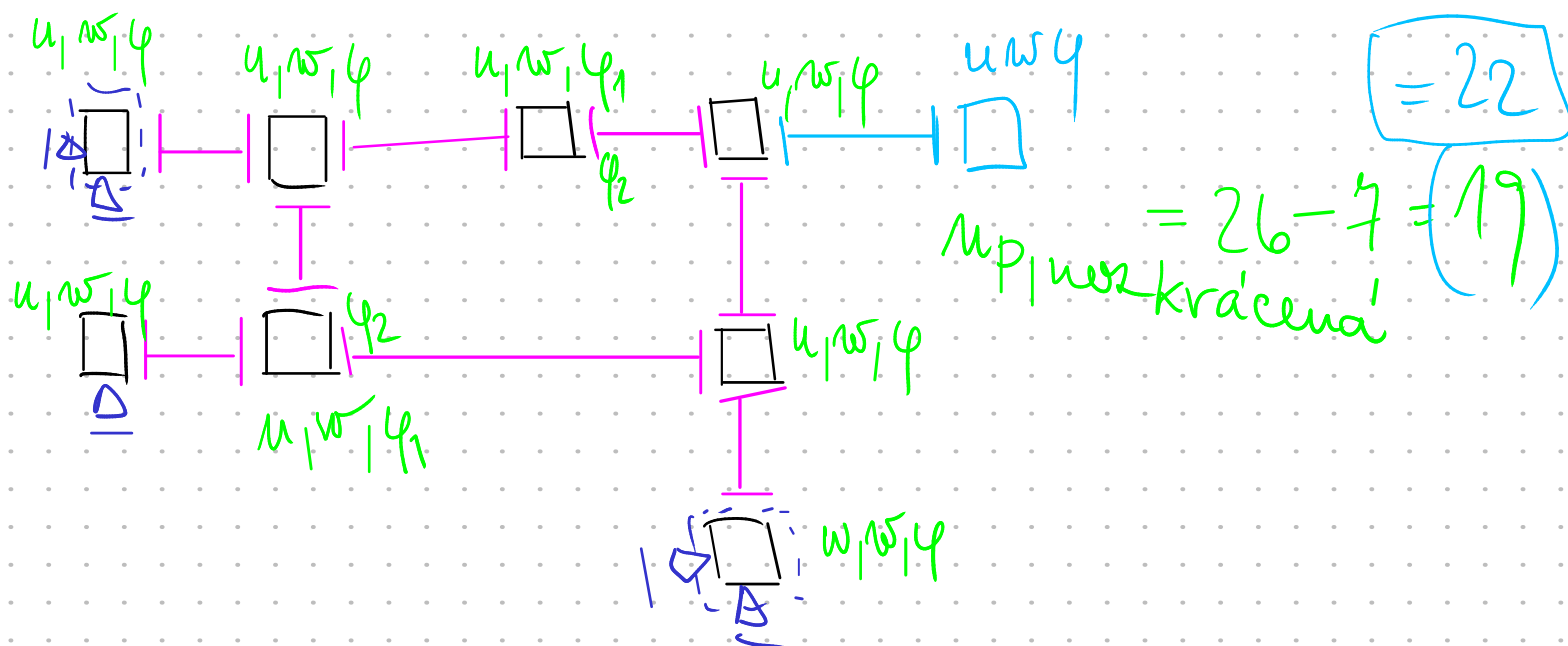
$$n_{P_{12}} = 4 + 3$$

(zjednotušena!)

$$\underline{n_{p1 \min} = 15}$$

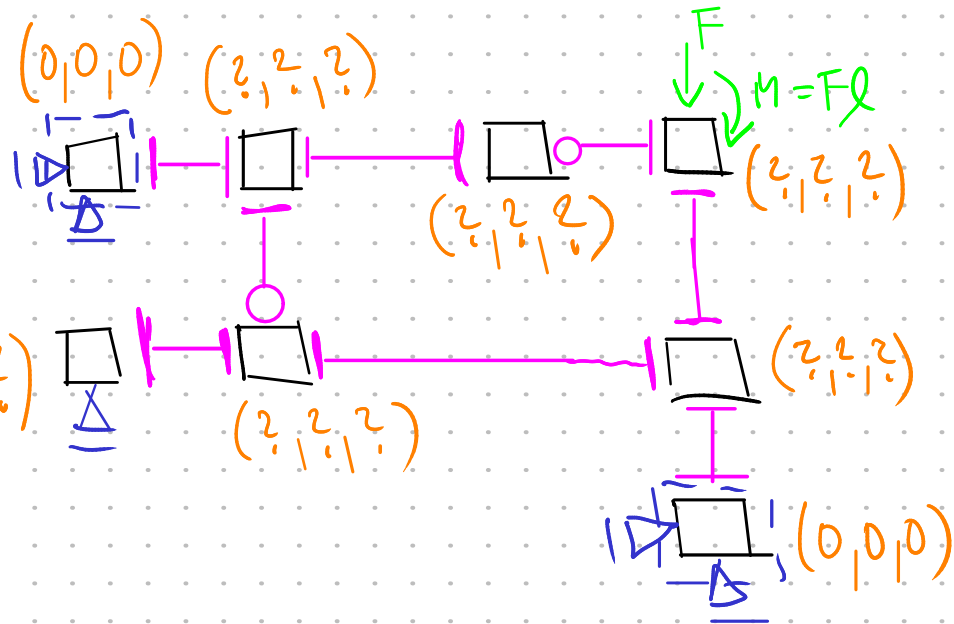
(zkrácená)



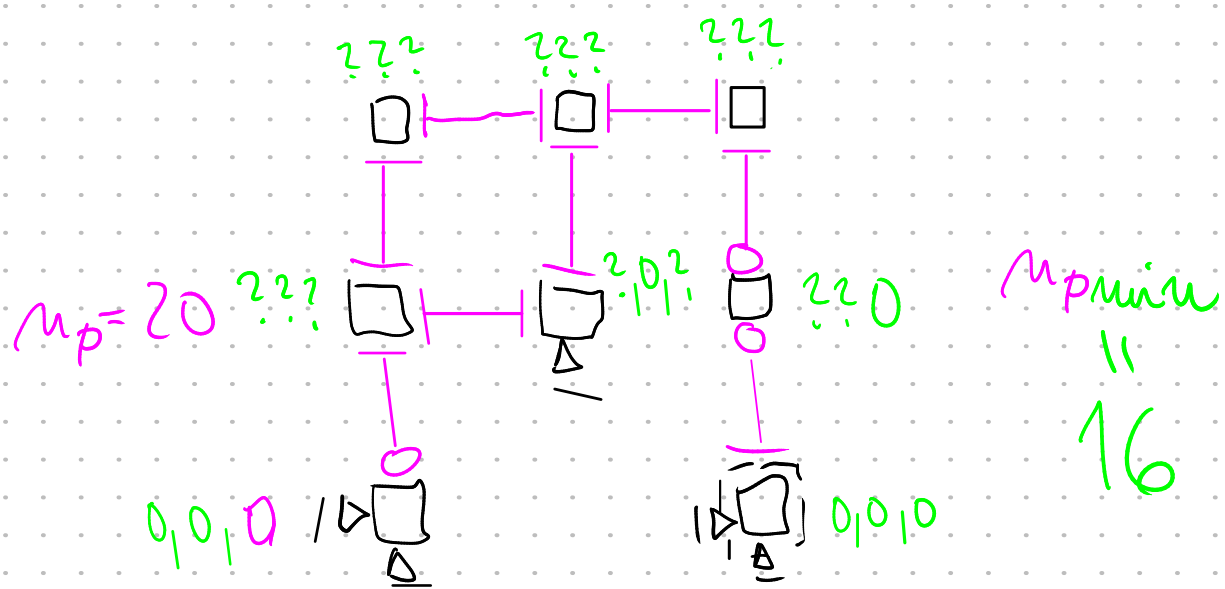
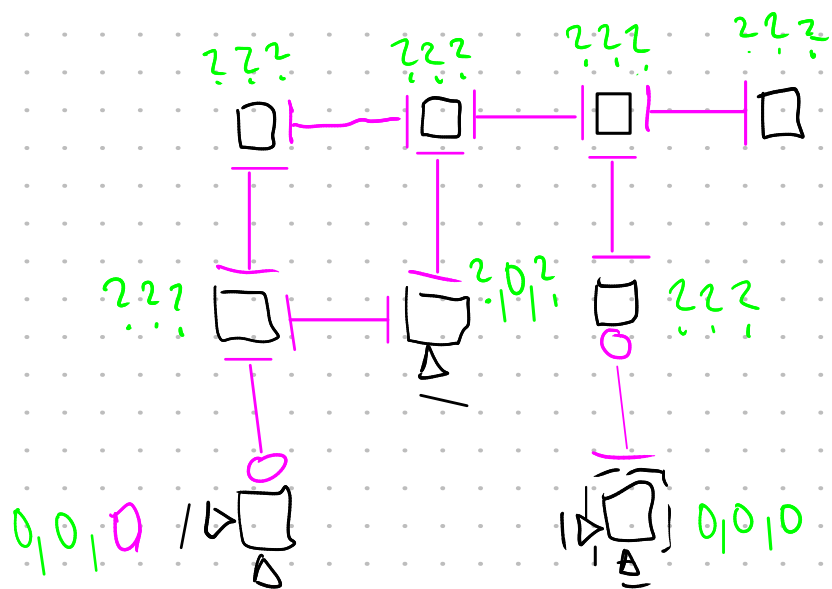
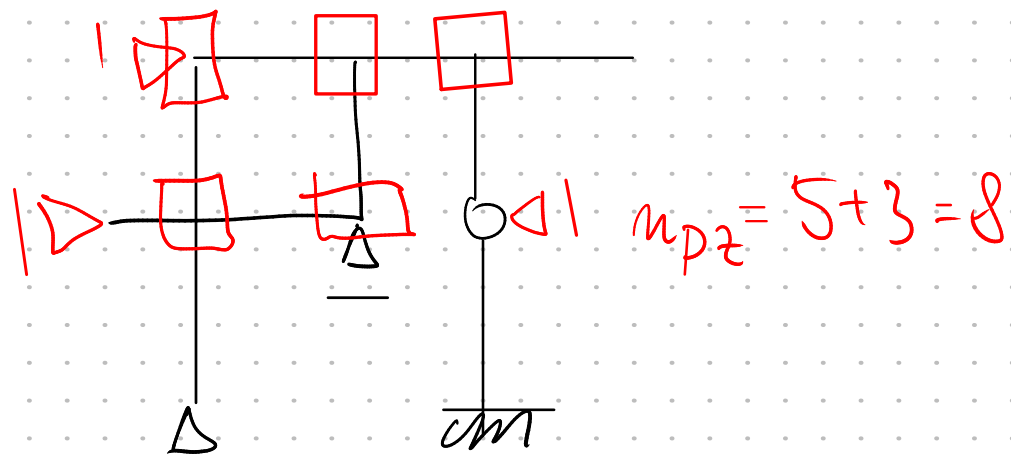
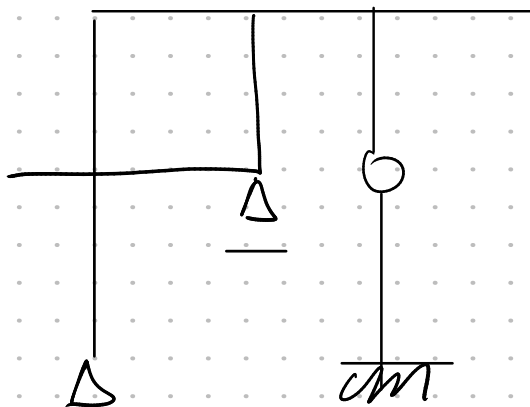


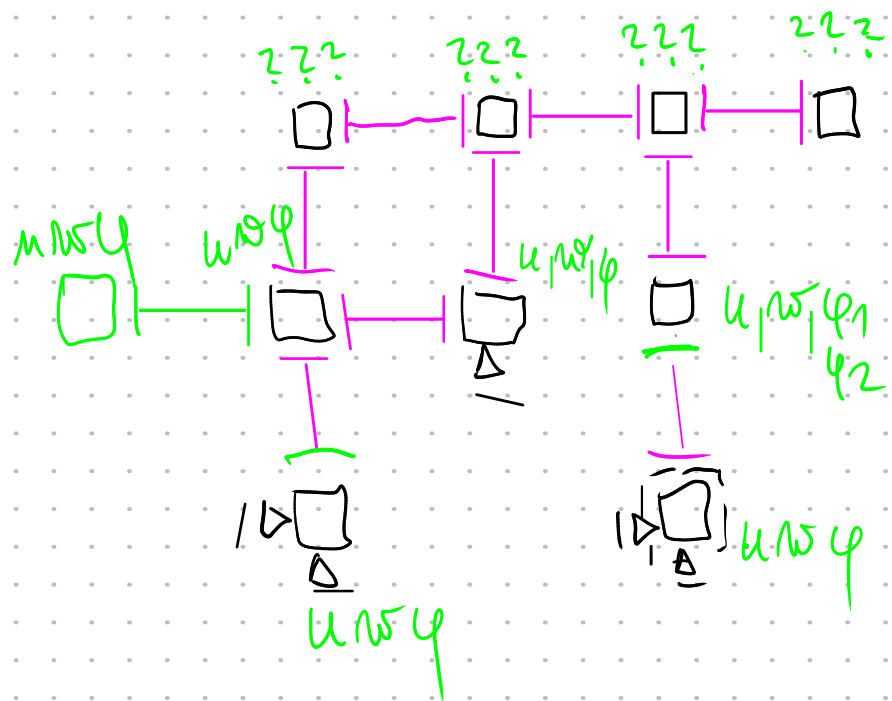
$n_{p \text{ nezkrátená}} = 26 - 7 = 19$

(u, ω, φ)

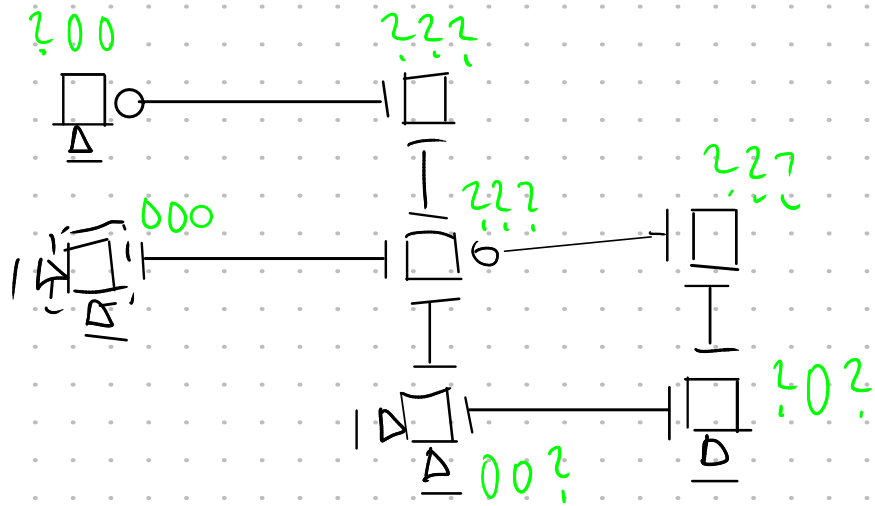
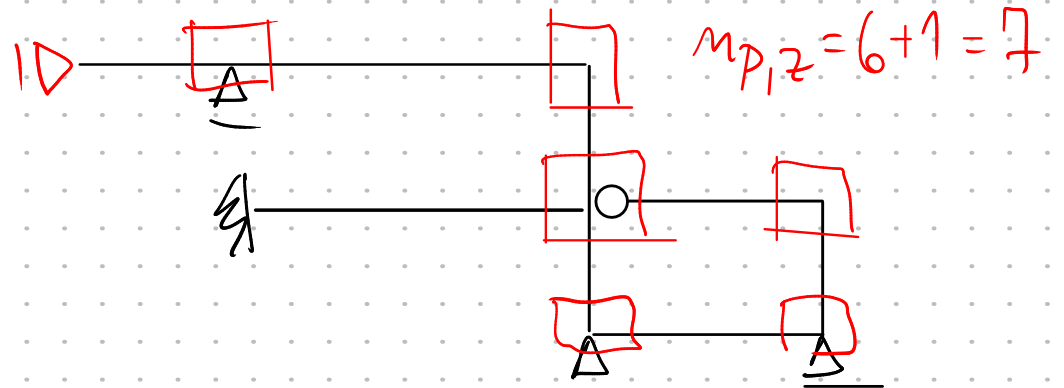
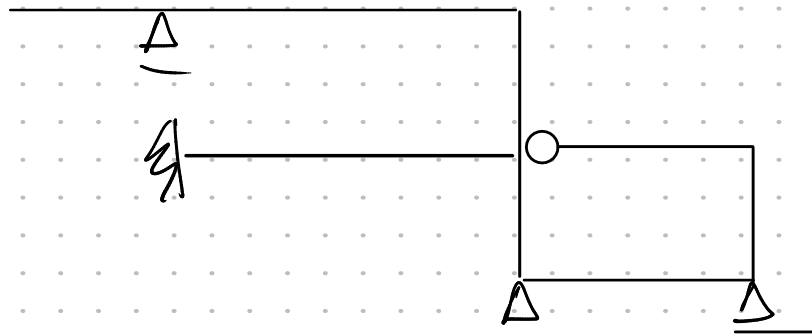


$n_p = 17$
(librovohá)

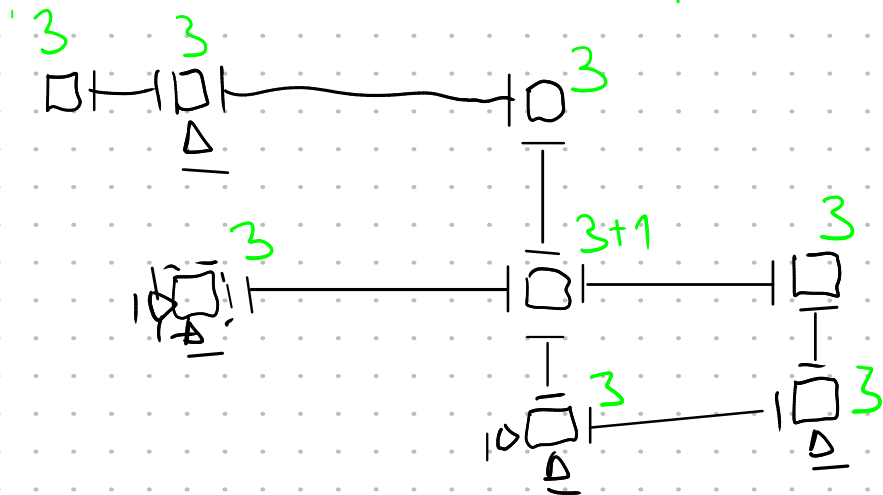


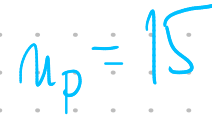


$$n_{p,net} = 31 - 6 = 25$$



$$n_{p,net} = 8 \cdot 3 + 1 - 7 = 18$$



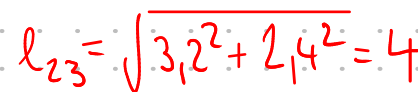


$$\cos \mu_{23} = +0,8$$

$$\sin \varphi_{23} = -0,6$$

$$I = 2 \cdot 10^{-3} \text{ m}^4 \quad A = 0,1 \text{ m}^2 \quad h = 0,4 \text{ m}$$

$$E = 24 \cdot 10^6 \text{ ePa} \quad \alpha_T = 10^{-5} \text{ } ^\circ\text{C}^{-1}$$



$$q = g \cos^2 \alpha = 64$$

$$n = g \sin \alpha \cos \alpha$$

$$= 4,8$$

$$\{M\} = \{4\}$$

$$\{S\} = \{-17\} = \{-4\}$$

$$k_{12} = \begin{bmatrix} u_1 & w_1 & \varphi_1 & u_2 & w_2 & \varphi_2 \\ -9600 & & & 48000 & & \\ -\frac{3EI}{l^2}C & & & \frac{3EI}{l} & & \end{bmatrix}$$

$$k_{23} = \begin{bmatrix} u_2 & w_2 & \varphi_2 & u_3 & w_3 & \varphi_3 \\ & & 36000 & & & \\ & & \frac{3EI}{l} & & & \end{bmatrix}$$

$$\begin{aligned} l_{12} &= \sqrt{1.8^2 + 2.4^2} = 3 & \cos \varphi_{23} &= +0.8 \\ \cos \varphi_{12} &= \frac{1.8}{3} = 0.6 & \sin \varphi_{23} &= -0.6 \\ \sin \varphi_{12} &= \frac{2.4}{3} = 0.8 & & \\ I &= 2 \cdot 10^{-5} \text{ m}^4 & A &= 0.1 \text{ m}^2 & h &= 0.4 \text{ m} \\ E &= 24 \cdot 10^6 \text{ Pa} & \alpha_T &= 10^{-5} \text{ } ^\circ\text{C}^{-1} \end{aligned}$$

$$[K] = [48 + 36] \cdot 10^3 = 84 \cdot 10^3$$

$$\tilde{R}_{12} = [k_{12}] \cdot \{\tilde{\pi}_{12}\} = -9600 \cdot 2.5 \cdot 10^{-3} = -24$$

$$\bar{R}_{23}^* = \left\{ \begin{matrix} u_2 & w_2 & \varphi_2 \\ -18 & & \end{matrix} \right\}^T$$

$$\bar{R}_{23}^* = \left\{ \begin{matrix} u_3 & w_3 & \varphi_3 \\ & & \end{matrix} \right\}^T$$

$$\left\{ \begin{matrix} \varphi_2 \\ +12.8 \\ \frac{1}{8} q l^2 \end{matrix} \right\}^T$$

$$\frac{3}{2} \frac{EI}{l} \alpha_T \Delta T_n$$

$$(T_d - T_n) = -5 - 5 = -10^\circ\text{C}$$

$$\{F\} = \{S\} - \{\bar{R}\} - \{\tilde{R}\}$$

$$\{F\} = \{-4\} - \{-18 + 12.8\} - \{-24\} = 25.2$$

$$\frac{10^{-5}}{10^{-5}} = 1$$

$$[K] \cdot \{\eta\} = \{F\}$$

$$84 \cdot 10^3 \cdot \varphi_2 = 25,2$$

$$\varphi_2 = \frac{25,2}{84 \cdot 10^3} = \underline{3 \cdot 10^{-4} \text{ rad}}$$

