



$$F_{12}^* = 40 \cdot \frac{3}{5} = 24 \text{ kN}$$

$$m_5 = 3$$

$$c_{ab} = \cos \gamma_{ab} = \frac{4}{5} = 0,6$$

$$s_{ab} = \sin \gamma_{ab} = -\frac{3}{5} = -0,8$$

$$l_{ab} = 5m$$

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

$$\{n\} = \{w_{F_2}\}$$

$$\{S\} = \{10 \cdot 10^3\}$$

Matice tuhosti

print a-b

print a-b

(8.2b)

[kab] =

10

u_a	u_b	q_a	u_b	q_b
.	.	.	239,568	.
.	.	.	-320,324	.
.	.	.	217	.
.	.	.	-239,568	.
.	.	.	<u>320,324</u>	.
.	.	.	0	.

u_a

u_b

$q_a = 10$

u_b

u_b

q_b

$$(8.3c) \quad [z_{bc}] = \begin{matrix} & u_b & w_b & \phi_b & u_c & w_c & \phi_c \\ \begin{matrix} u_b \\ w_b \\ \phi_b \\ u_c \\ w_c \\ \phi_c \end{matrix} & \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & \boxed{0.9} & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & -0.9 & 0 & 0 & 1 & 0 \\ 0 & -4.5 & 0 & 0 & 0 & 1 \end{bmatrix} \end{matrix} \cdot 10$$

$$[K] = [320,324 + 0,9] \cdot 10^6 = [321,224] \cdot 10^6$$

PRIMAŘNÍ VEKTORY

prut a-b

$$\{\bar{R}_{ab}\} = \{\bar{x}_{ab}, \bar{z}_{ab}, \bar{m}_{ab}, \bar{x}_{ba}, \bar{z}_{ba}, \bar{m}_{ba}\}^T$$

$$s.1b/2 = \{16; -16,5; 22,5; 16; -4,5; 0\}^T \cdot 10^3$$

$$s.4a \quad \begin{matrix} u_a & w_a & q_a & u_b & w_b & q_b \end{matrix}$$

$$\{\bar{R}_{ab}\} = \{-3,6; -22,7; 22,5; 3,6; \boxed{-14,3}; 0\}^T \cdot 10^3$$

prut b-c

$$\{\bar{R}_{bc}\} = \{\bar{R}_{bc}\} = \{0; -30; 0; 0; -50; -50\}^T \cdot 10^3 +$$

$$s.1c/5 \quad \{0; -9; +30; 0; 9; 15\}^T \cdot 10^3$$

$$\{\bar{R}_{bc}\} = \{0; \boxed{-39}; 30; 0; -41; -35\}^T \cdot 10^3$$

$$\begin{matrix} u_b & w_b & q_b & u_c & w_c & q_c \end{matrix}$$

vektor sil

$$\{F\} = \{S\} - \{R\} = \{S\} - (\{\bar{R}_{ab}\} + \{\bar{R}_{bc}\}) =$$

$$= (10 - (-14,3 + (-39))) \cdot 10^3 = 66,3 \cdot 10^3$$

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

$$321,224 \cdot 10^6 \cdot w_2 = 66,3 \cdot 10^3$$

$$w_2 = \cancel{14137} \quad 2,064 \cdot 10^{-4} \text{ m}$$

Úpočet koncových sil:

$$\{\hat{R}_{ab}\} = \{\bar{R}_{ab}\} + \{\hat{R}_{ab}\} = \{\bar{R}_{ab}\} + [k_{ab}] \cdot \{x_{ab}\}$$

$$\{\hat{R}_{ab}\} = \begin{Bmatrix} -3,6 \\ -22,7 \\ 22,5 \\ 3,6 \\ -14,3 \\ 0 \end{Bmatrix} \cdot 10^3 + \begin{Bmatrix} \dots & 239,568 & \dots \\ \dots & -320,324 & \dots \\ \dots & 2,7 & \dots \\ \dots & -239,568 & \dots \\ \dots & 320,324 & \dots \\ \dots & 0 & \dots \end{Bmatrix} \begin{Bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0,2064 \end{Bmatrix} \cdot 10^6 \cdot 10^{-3} = \begin{Bmatrix} 45,847 \\ -88,815 \\ 23,057 \\ -45,847 \\ 48,815 \\ 0 \end{Bmatrix} \cdot 10^3$$

$$\{R_{bc}\} = \begin{Bmatrix} 0 \\ -39 \\ 30 \\ 40 \\ -41 \\ -35 \end{Bmatrix} \cdot 10^3 + \begin{Bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0,9 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -0,9 & 0 & 0 & 0 & 0 \\ 0 & -4,5 & 0 & 0 & 0 & 0 \end{Bmatrix} \begin{Bmatrix} 0 \\ 0,2064 \\ 0 \\ 0 \\ 0 \\ 0 \end{Bmatrix} \cdot 10^6 \cdot 10^{-3} = \begin{Bmatrix} 0 \\ -38,814 \\ 30 \\ 40 \\ -41,186 \\ -35,929 \end{Bmatrix} \cdot 10^3$$

8.7b

$$\{R_{ab}^*\} = \{98,56; -16,611; 23,054; -66,56; -4,389; -38,814\} \cdot 10^3$$

