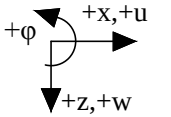
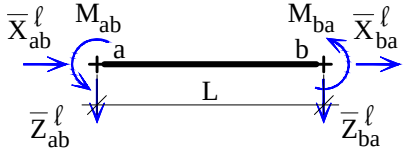
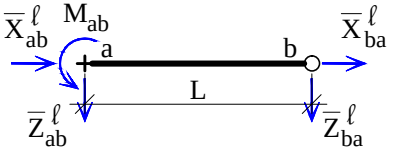
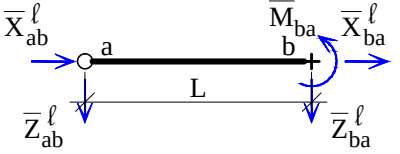
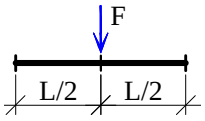
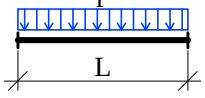
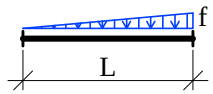
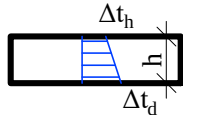
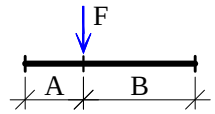
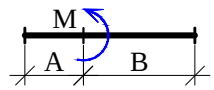
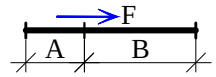
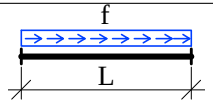
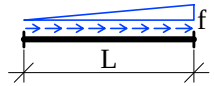
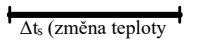
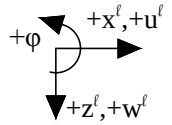
DEFORMAČNÍ METODA – Koncové momenty a síly od prutového zatížení

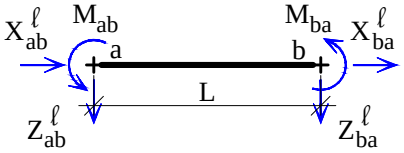
	prut typu V–V	prut typu V–K	prut typu K–V
			
	$\overline{M}_{ab}=\frac{FL}{8}$	$\overline{M}_{ba}=-\frac{FL}{8}$	$\overline{M}_{ab}=\frac{3}{16}FL$	✘	✘	$\overline{M}_{ba}=-\frac{3}{16}FL$
	$\overline{Z}^{\ell}_{ab}=-\frac{F}{2}$	$\overline{Z}^{\ell}_{ba}=-\frac{F}{2}$	$\overline{Z}^{\ell}_{ab}=-\frac{11F}{16}$	$\overline{Z}^{\ell}_{ba}=-\frac{5F}{16}$	$\overline{Z}^{\ell}_{ab}=-\frac{5F}{16}$	$\overline{Z}^{\ell}_{ba}=-\frac{11F}{16}$
	$\overline{M}_{ab}=\frac{fL^2}{12}$	$\overline{M}_{ba}=-\frac{fL^2}{12}$	$\overline{M}_{ab}=\frac{fL^2}{8}$	✘	✘	$\overline{M}_{ba}=-\frac{fL^2}{8}$
	$\overline{Z}^{\ell}_{ab}=-\frac{fL}{2}$	$\overline{Z}^{\ell}_{ba}=-\frac{fL}{2}$	$\overline{Z}^{\ell}_{ab}=-\frac{5fL}{8}$	$\overline{Z}^{\ell}_{ba}=-\frac{3fL}{8}$	$\overline{Z}^{\ell}_{ab}=-\frac{3fL}{8}$	$\overline{Z}^{\ell}_{ba}=-\frac{5fL}{8}$
	$\overline{M}_{ab}=\frac{fL^2}{30}$	$\overline{M}_{ba}=-\frac{fL^2}{20}$	$\overline{M}_{ab}=\frac{7fL^2}{120}$	✘	✘	$\overline{M}_{ba}=-\frac{fL^2}{15}$
	$\overline{Z}^{\ell}_{ab}=-\frac{3fL}{20}$	$\overline{Z}^{\ell}_{ba}=-\frac{7fL}{20}$	$\overline{Z}^{\ell}_{ab}=-\frac{27fL}{120}$	$\overline{Z}^{\ell}_{ba}=-\frac{33fL}{120}$	$\overline{Z}^{\ell}_{ab}=-\frac{fL}{10}$	$\overline{Z}^{\ell}_{ba}=-\frac{2fL}{5}$
	$\overline{M}_{ab}=EI\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	$\overline{M}_{ba}=-EI\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	$\overline{M}_{ab}=\frac{3}{2}EI\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	✘	✘	$\overline{M}_{ba}=-\frac{3}{2}EI\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$
	$\overline{Z}^{\ell}_{ab}=0$	$\overline{Z}^{\ell}_{ba}=0$	$\overline{Z}^{\ell}_{ab}=-\frac{3EI}{2L}\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	$\overline{Z}^{\ell}_{ba}=\frac{3EI}{2L}\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	$\overline{Z}^{\ell}_{ab}=\frac{3EI}{2L}\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$	$\overline{Z}^{\ell}_{ba}=-\frac{3EI}{2L}\alpha_t\frac{\Delta t_d-\Delta t_h}{h}$
	$\overline{M}_{ab}=\frac{FAB^2}{L^2}$	$\overline{M}_{ba}=-\frac{FA^2B}{L^2}$	$\overline{M}_{ab}=\frac{FAB}{2L^2}(B+L)$	✘	✘	$\overline{M}_{ba}=-\frac{FAB}{2L^2}(A+L)$
	$\overline{Z}^{\ell}_{ab}$, $\overline{Z}^{\ell}_{ba}$ se dopočítají z podmínek rovnováhy prutu					
	$\overline{M}_{ab}=\frac{MB}{L^2}(2L-3B)$	$\overline{M}_{ba}=\frac{MA}{L^2}(2L-3A)$	$\overline{M}_{ab}=\frac{M}{2L^2}(L^2-3B^2)$	✘	✘	$\overline{M}_{ba}=\frac{M}{2L^2}(L^2-3A^2)$
	$\overline{Z}^{\ell}_{ab}$, $\overline{Z}^{\ell}_{ba}$ se dopočítají z podmínek rovnováhy prutu					
	$\overline{X}^{\ell}_{ab}=-\frac{FB}{L}$	$\overline{X}^{\ell}_{ba}=-\frac{FA}{L}$	$\overline{X}^{\ell}_{ab}=-\frac{FB}{L}$	$\overline{X}^{\ell}_{ba}=-\frac{FA}{L}$	$\overline{X}^{\ell}_{ab}=-\frac{FB}{L}$	$\overline{X}^{\ell}_{ba}=-\frac{FA}{L}$
	$\overline{X}^{\ell}_{ab}=-\frac{fL}{2}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{2}$	$\overline{X}^{\ell}_{ab}=-\frac{fL}{2}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{2}$	$\overline{X}^{\ell}_{ab}=-\frac{fL}{2}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{2}$
	$\overline{X}^{\ell}_{ab}=-\frac{fL}{6}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{3}$	$\overline{X}^{\ell}_{ab}=-\frac{fL}{6}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{3}$	$\overline{X}^{\ell}_{ab}=-\frac{fL}{6}$	$\overline{X}^{\ell}_{ba}=-\frac{fL}{3}$
	$\overline{X}^{\ell}_{ab}=EA\alpha_t\Delta t_s$	$\overline{X}^{\ell}_{ba}=-EA\alpha_t\Delta t_s$	$\overline{X}^{\ell}_{ab}=EA\alpha_t\Delta t_s$	$\overline{X}^{\ell}_{ba}=-EA\alpha_t\Delta t_s$	$\overline{X}^{\ell}_{ab}=EA\alpha_t\Delta t_s$	$\overline{X}^{\ell}_{ba}=-EA\alpha_t\Delta t_s$

Vladimír Šána, Petr Furmánek, Václav Šmilauer ver. 2018/10/7

DEFORMAČNÍ METODA – Celkové koncové momenty a síly



prut typu V–V



$$M_{ab}=\overline{M}_{ab}+k\left(2\varphi_a+\varphi_b+3\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$Z_{ab}^\ell=\overline{Z}_{ab}^\ell-\frac{k}{L}\left(3\varphi_a+3\varphi_b+6\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ab}^\ell=\overline{X}_{ab}^\ell-n(u_b^\ell-u_a^\ell)$$

$$M_{ba}=\overline{M}_{ba}+k\left(\varphi_a+2\varphi_b+3\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$Z_{ba}^\ell=\overline{Z}_{ba}^\ell+\frac{k}{L}\left(3\varphi_a+3\varphi_b+6\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ba}^\ell=\overline{X}_{ba}^\ell+n(u_b^\ell-u_a^\ell)$$

$$\mathbf{k=\frac{2EI}{L}}$$

prut typu V–K

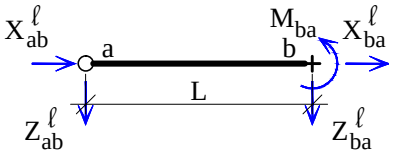
$$M_{ab}=\overline{M}_{ab}+k\left(1{,}5\varphi_a+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$Z_{ab}^\ell=\overline{Z}_{ab}^\ell-\frac{k}{L}\left(1{,}5\varphi_a+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ab}^\ell=\overline{X}_{ab}^\ell-n(u_b^\ell-u_a^\ell)$$

✘

$$Z_{ba}^\ell=\overline{Z}_{ba}^\ell+\frac{k}{L}\left(1{,}5\varphi_a+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ba}^\ell=\overline{X}_{ba}^\ell+n(u_b^\ell-u_a^\ell)$$

$$\mathbf{n=\frac{EA}{L}}$$

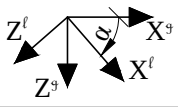
prut typu K–V



✘

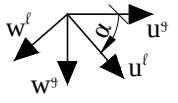
$$Z_{ab}^\ell=\overline{Z}_{ab}^\ell-\frac{k}{L}\left(1{,}5\varphi_b+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ab}^\ell=\overline{X}_{ab}^\ell-n(u_b^\ell-u_a^\ell)$$

$$M_{ba}=\overline{M}_{ba}+k\left(1{,}5\varphi_b+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$Z_{ba}^\ell=\overline{Z}_{ba}^\ell+\frac{k}{L}\left(1{,}5\varphi_b+1{,}5\frac{w_b^\ell-w_a^\ell}{L}\right)$$
$$X_{ba}^\ell=\overline{X}_{ba}^\ell+n(u_b^\ell-u_a^\ell)$$



Transformace koncových sil

$$X^g=X^\ell\cos\alpha-Z^\ell\sin\alpha$$
$$Z^g=X^\ell\sin\alpha+Z^\ell\cos\alpha$$



Transformace styčníkových posunů

$$u^\ell=\ \ u^g\cos\alpha+w^g\sin\alpha$$
$$w^\ell=-u^g\sin\alpha+w^g\cos\alpha$$

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