

$$K_{b,vv} =$$

$\frac{2 \cdot EI}{l}$	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	1	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	1
$\frac{\sin \alpha}{l}$	6	-6	3	-6	6	3
$\frac{\cos \alpha}{l}$	-6	6	-3	6	-6	-3
1	3	-3	2	-3	3	1
$\frac{\sin \alpha}{l}$	-6	6	-3	6	-6	-3
$\frac{\cos \alpha}{l}$	6	-6	3	-6	6	3
1	3	-3	1	-3	3	2

$$K_{b,vk} =$$

$\frac{3 \cdot EI}{l}$	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	1	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	0
$\frac{\sin \alpha}{l}$	1	-1	1	-1	1	0
$\frac{\cos \alpha}{l}$	-1	1	-1	1	-1	0
1	1	-1	1	-1	1	0
$\frac{\sin \alpha}{l}$	-1	1	-1	1	-1	0
$\frac{\cos \alpha}{l}$	1	-1	1	-1	1	0
0	0	0	0	0	0	0

$K_{b,KV} =$

$\frac{3 \cdot EI}{l}$	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	0	$\frac{\sin \alpha}{l}$	$\frac{\cos \alpha}{l}$	1
$\frac{\sin \alpha}{l}$	1	-1	0	-1	1	1
$\frac{\cos \alpha}{l}$	-1	1	0	1	-1	-1
0	0	0	0	0	0	0
$\frac{\sin \alpha}{l}$	-1	1	0	1	-1	-1
$\frac{\cos \alpha}{l}$	1	-1	0	-1	1	1
1	1	-1	0	-1	1	1

$${}^m K = \frac{EA}{l} \cdot \begin{bmatrix} \cos^2 \alpha & \cos \alpha \cdot \sin \alpha & 0 & -\cos^2 \alpha & -\cos \alpha \cdot \sin \alpha & 0 \\ \cos \alpha \cdot \sin \alpha & \sin^2 \alpha & 0 & -\cos \alpha \cdot \sin \alpha & -\sin^2 \alpha & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\cos^2 \alpha & -\cos \alpha \cdot \sin \alpha & 0 & \cos^2 \alpha & \cos \alpha \cdot \sin \alpha & 0 \\ -\cos \alpha \cdot \sin \alpha & -\sin^2 \alpha & 0 & \cos \alpha \cdot \sin \alpha & \sin^2 \alpha & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$${}^m K = \frac{EA}{l} \cdot \begin{bmatrix} c^2 & c \cdot s & 0 & -c^2 & -c \cdot s & 0 \\ c \cdot s & s^2 & 0 & -c \cdot s & -s^2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -c^2 & -c \cdot s & 0 & c^2 & c \cdot s & 0 \\ -c \cdot s & -s^2 & 0 & c \cdot s & s^2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\vec{f}_{i,j}^{(f)} = \begin{bmatrix} -c \cdot X'_{i,j} + s \cdot Z'_{i,j} \\ -s \cdot X'_{i,j} - c \cdot Z'_{i,j} \\ -M'_{i,j} \\ -c \cdot X'_{j,i} + s \cdot Z'_{j,i} \\ -s \cdot X'_{j,i} - c \cdot Z'_{j,i} \\ -M'_{j,i} \end{bmatrix}$$