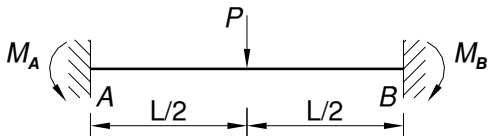
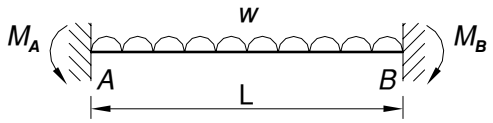
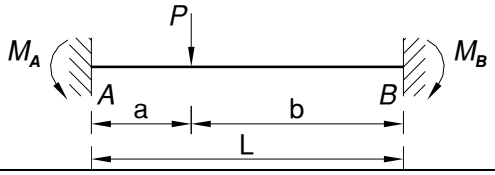
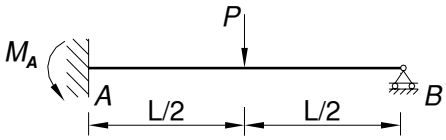
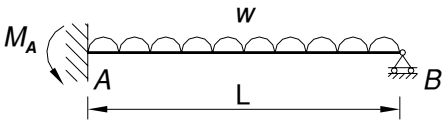
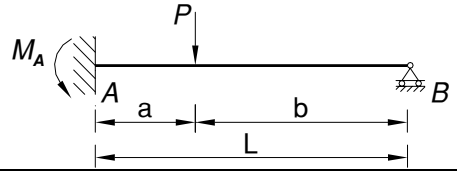
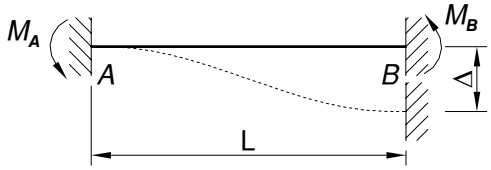
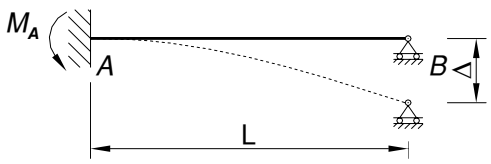
Fixed-End Moments

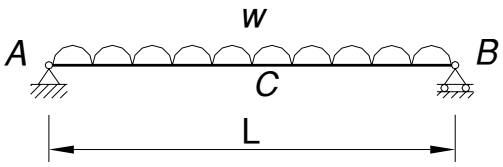
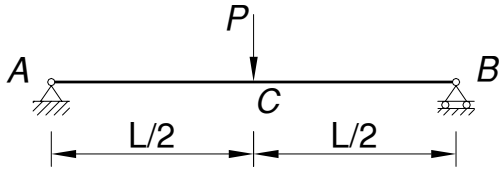
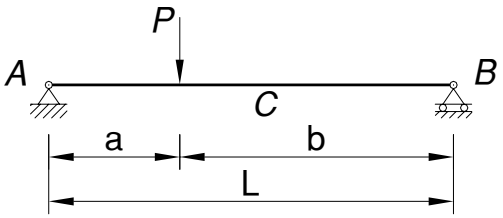
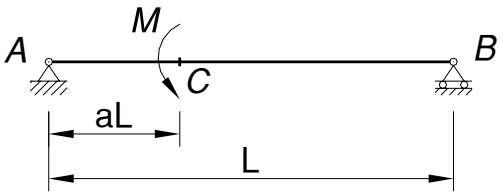
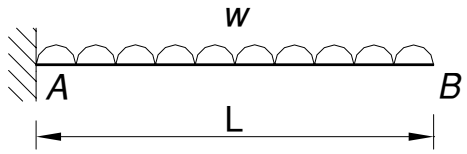
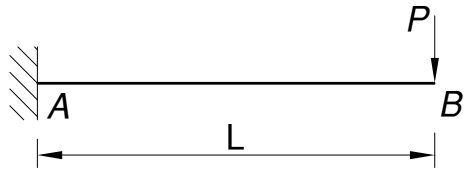
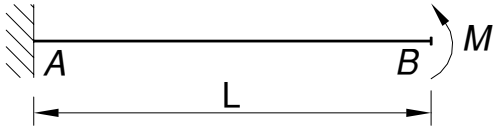
Loading

M_A	Configuration	M_B
$+\frac{PL}{8}$		$-\frac{PL}{8}$
$+\frac{wL^2}{12}$		$-\frac{wL^2}{12}$
$+\frac{Pab^2}{L^2}$		$-\frac{Pa^2b}{L^2}$
$+\frac{3PL}{16}$		-
$+\frac{wL^2}{8}$		-
$+\frac{Pab(2L-a)}{2L^2}$		-

Displacements

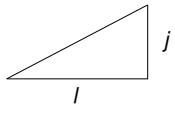
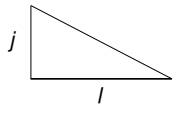
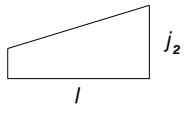
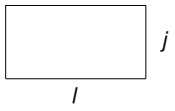
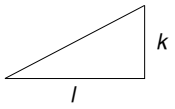
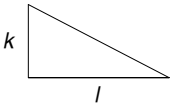
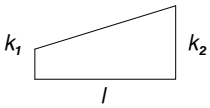
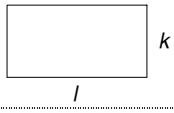
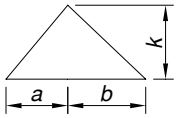
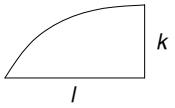
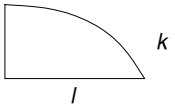
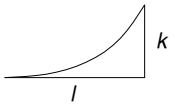
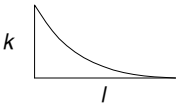
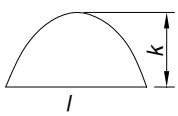
M_A	Configuration	M_B
$+\frac{6EI\Delta}{L^2}$		$+\frac{6EI\Delta}{L^2}$
$+\frac{3EI\Delta}{L^2}$		-

Displacements

Configuration	Translations	Rotations
	$\delta_C = \frac{5wL^4}{384EI}$	$\theta_A = -\theta_B = \frac{wL^3}{24EI}$
	$\delta_C = \frac{PL^3}{48EI}$	$\theta_A = -\theta_B = \frac{PL^2}{16EI}$
	$\delta_C \cong \frac{PL^3}{48EI}\left[\frac{3a}{L} - 4\left(\frac{a}{L}\right)^3\right]$	$\theta_A = \frac{Pa(L-a)}{6LEI}(2L-a)$ $\theta_B = -\frac{Pa}{6LEI}(L^2-a^2)$
	$\delta_C = \frac{ML^2}{3EI}a(1-a)(1-2a)$	$\theta_A = \frac{ML}{6EI}(3a^2-6a+2)$ $\theta_B = \frac{ML}{6EI}(3a^2-1)$
	$\delta_B = \frac{wL^4}{8EI}$	$\theta_B = \frac{wL^3}{6EI}$
	$\delta_B = \frac{PL^3}{3EI}$	$\theta_B = \frac{PL^2}{2EI}$
	$\delta_B = \frac{ML^2}{2EI}$	$\theta_B = \frac{ML}{EI}$

Virtual Work

Volume Integrals

				
	$\frac{1}{3}jkl$	$\frac{1}{6}jkl$	$\frac{1}{6}(j_1+2j_2)kl$	$\frac{1}{2}jkl$
	$\frac{1}{6}jkl$	$\frac{1}{3}jkl$	$\frac{1}{6}(2j_1+j_2)kl$	$\frac{1}{2}jkl$
	$\frac{1}{6}j(k_1+2k_2)l$	$\frac{1}{6}j(2k_1+k_2)l$	$\frac{1}{6}\left[j_1(2k_1+k_2)+j_2(k_1+2k_2)\right]l$	$\frac{1}{2}j(k_1+k_2)l$
	$\frac{1}{2}jkl$	$\frac{1}{2}jkl$	$\frac{1}{2}(j_1+j_2)kl$	jkl
	$\frac{1}{6}jk(l+a)$	$\frac{1}{6}jk(l+b)$	$\frac{1}{6}\left[j_1(l+b)+j_2(l+a)\right]k$	$\frac{1}{2}jkl$
	$\frac{5}{12}jkl$	$\frac{1}{4}jkl$	$\frac{1}{12}(3j_1+5j_2)kl$	$\frac{2}{3}jkl$
	$\frac{1}{4}jkl$	$\frac{5}{12}jkl$	$\frac{1}{12}(5j_1+3j_2)kl$	$\frac{2}{3}jkl$
	$\frac{1}{4}jkl$	$\frac{1}{12}jkl$	$\frac{1}{12}(j_1+3j_2)kl$	$\frac{1}{3}jkl$
	$\frac{1}{12}jkl$	$\frac{1}{4}jkl$	$\frac{1}{12}(3j_1+j_2)kl$	$\frac{1}{3}jkl$
	$\frac{1}{3}jkl$	$\frac{1}{3}jkl$	$\frac{1}{3}(j_1+j_2)kl$	$\frac{2}{3}jkl$