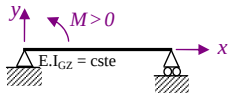
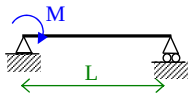
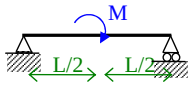
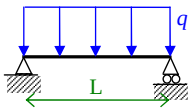
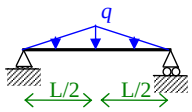
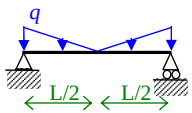
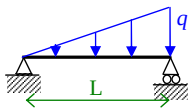
Formulaire des flèches et rotations de poutres isostatiques :

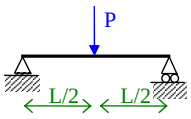
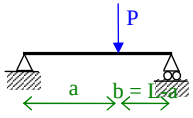
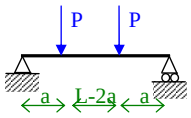
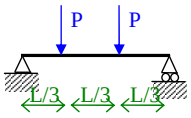
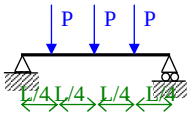
Poutres :

- portée L ;
- module d'Young du matériau : E ;
- moment quadratique de la section : I_{GZ} ;
- repère :

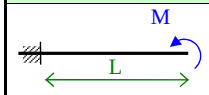
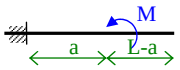
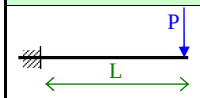
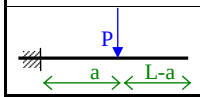
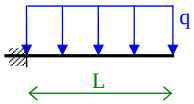
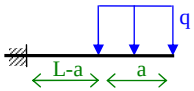
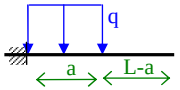
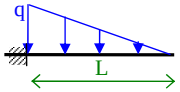
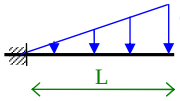


I) Poutres sur 2 appuis

Schémas	Flèches (f)	Rotations (ω)
Chargements : moments :		
	$f_{max} = f_{\left(L-\frac{L}{\sqrt{3}}\right)} = -\frac{M\times L^2}{9\sqrt{3}\times E\times I_{GZ}}$ $f_{(L/2)} = -\frac{M\times L^2}{16\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{M\times L}{3\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{M\times L}{6\times E\times I_{GZ}}$
	$f_{(L/2)} = 0$	$\omega' = \omega_{(0)} = \frac{M\times L}{24\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{M\times L}{24\times E\times I_{GZ}}$
	$f_{(L/2)} = -\frac{(M_A+M_B)\times L^2}{16\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{(2\times M_A+M_B)\times L}{6\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{(M_A+2\times M_B)\times L}{6\times E\times I_{GZ}}$
Chargements : charges linéiques :		
	$f_{max} = f_{(L/2)} = -\frac{5\times q\times L^4}{384\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{q\times L^3}{24\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{q\times L^3}{24\times E\times I_{GZ}}$
	$f_{max} = f_{(L/2)} = -\frac{q\times L^4}{120\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{5\times q\times L^3}{192\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{5\times q\times L^3}{192\times E\times I_{GZ}}$
	$f_{max} = f_{(L/2)} = -\frac{3\times q\times L^4}{640\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{q\times L^3}{64\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{q\times L^3}{64\times E\times I_{GZ}}$
	$f_{max} = f_{(0,5193L)} = -\frac{q\times L^4}{153,3\times E\times I_{GZ}}$ $f_{(L/2)} = -\frac{5\times q\times L^4}{768\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{7\times q\times L^3}{360\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{q\times L^3}{45\times E\times I_{GZ}}$

Schémas	Flèches (f)	Rotations (ω)
Chargements : forces ponctuelles :		
	$f_{max} = f_{(L/2)} = -\frac{P\times L^3}{48\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{P\times L^2}{16\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{P\times L^2}{16\times E\times I_{GZ}}$
	$f_{max} = f_{\left(\sqrt{\frac{(L^2-b^2)}{3}}\right)} = -\frac{P\times b\left(L^2-b^2\right)^{3/2}}{9\sqrt{3}\times L\times E\times I_{GZ}}$ $f_{(a)} = -\frac{P\times a^2\times b^2}{3\times L\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{P\times a\times b\times(L+b))}{6\times L\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{P\times a\times b\times(L+a))}{6\times L\times E\times I_{GZ}}$
	$f_{max} = f_{(L/2)} = -\frac{P\times a\times\left(3L^2-4a^2\right)}{24\times E\times I_{GZ}}$ $f_{(a)} = -\frac{P\times a^2\times(3L-4a)}{6\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{P\times a\times(L-a))}{2\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{P\times a\times(L-a))}{2\times E\times I_{GZ}}$
	$f_{max} = f_{(L/2)} = -\frac{23\times P\times L^3}{648\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{P\times L^2}{9\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{P\times L^2}{9\times E\times I_{GZ}}$
	$f_{max} = f_{(L/2)} = -\frac{19\times P\times L^3}{384\times E\times I_{GZ}}$	$\omega' = \omega_{(0)} = -\frac{5\times P\times L^2}{32\times E\times I_{GZ}}$ $\omega'' = \omega_{(L)} = \frac{5\times P\times L^2}{32\times E\times I_{GZ}}$

II) Consoles

Schémas	Flèches (f)	Rotations (ω)
Chargements : moments :		
	$f_{max} = f_{(L)} = \frac{M \times L^2}{2 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = \frac{M \times L}{E \times I_{GZ}}$
	$f_{max} = f_{(L)} = \frac{M \times a \times (2L - a)}{2 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = \frac{M \times a}{E \times I_{GZ}}$
Chargements : forces ponctuelles :		
	$f_{max} = f_{(L)} = -\frac{P \times L^3}{3 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{P \times L^2}{2 \times E \times I_{GZ}}$
	$f_{max} = f_{(L)} = -\frac{P \times a^2 \times (3 \times L - a)}{6 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{P \times a^2}{2 \times E \times I_{GZ}}$
Chargements : charges réparties :		
	$f_{max} = f_{(L)} = -\frac{q \times L^4}{8 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{q \times L^3}{6 \times E \times I_{GZ}}$
	$f_{max} = f_{(L)} = -\frac{q \times a \left(a^3 - 6a \times L^2 + 8L^3\right)}{24 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{q \times a \left(a^2 - 3a \times L + 3L^2\right)}{6 \times E \times I_{GZ}}$
	$f_{max} = f_{(L)} = \frac{q \times a^3 (a - 4 \times L)}{24 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{q \times a^3}{6 \times E \times I_{GZ}}$
	$f_{max} = f_{(L)} = -\frac{q \times L^4}{30 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{q \times L^3}{24 \times E \times I_{GZ}}$
	$f_{max} = f_{(L)} = -\frac{11 \times q \times L^4}{120 \times E \times I_{GZ}}$	$\omega'' = \omega_{(L)} = -\frac{q \times L^3}{8 \times E \times I_{GZ}}$