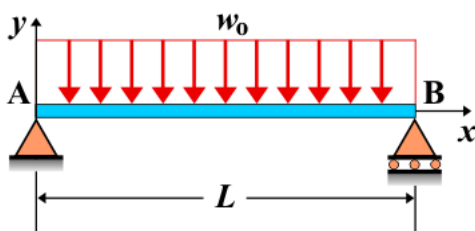


Pruebe **Calculador de deformación de Vigas** en vaxasoftware.com

Simbolo	Magnitud	Unidades
$E \cdot I$	Rigidez a flexión	$\text{N} \cdot \text{m}^2, \text{Pa} \cdot \text{m}^4$
y	Deflexión, deformación, flecha	m
θ	Pendiente, giro	-
x	Posición del punto de estudio (distancia desde el origen)	m
L	Longitud de la viga (sin vano lateral)	m
M	Momento flector, flector, momento aplicado	$\text{N} \cdot \text{m}$
P	Carga puntual, carga concentrada	N
w	Carga distribuida	N/m
R	Reacción	N
V	Esfuerzo cortante, cortante	N

Viga simple apoyada - Carga uniforme en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x}{24EI} (L^3 - 2Lx^2 + x^3)$

$y_{MAX} = \frac{-5w_0 L^4}{384EI}$ para $x = \frac{L}{2}$

Pendiente $\theta_{AB} = \frac{-w_0}{24EI} (L^3 - 6Lx^2 + 4x^3)$

$\theta_A = -\theta_B = \frac{-w_0 L^3}{24EI}$

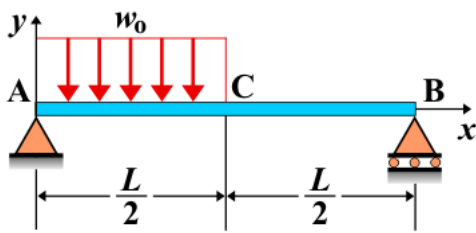
Momento $M_{AB} = \frac{w_0 x}{2} (L - x)$

$M_{MAX} = \frac{w_0 L^2}{8}$ para $x = \frac{L}{2}$

Cortante $V_{AB} = \frac{w_0}{2} (L - 2x)$

Reacciones $R_A = R_B = \frac{w_0 L}{2}$

Viga simple apoyada - Carga uniforme en la mitad del vano



Deflexión $y_{AC} = \frac{-w_0 x}{384EI} (9L^3 - 24Lx^2 + 16x^3)$
 $y_{CB} = \frac{-w_0 L}{384EI} (8x^3 - 24Lx^2 + 17L^2x - L^3)$

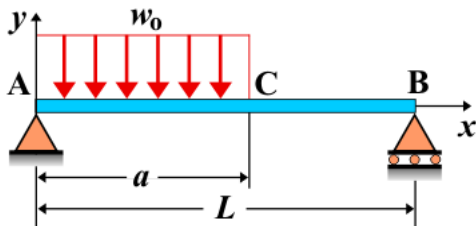
Pendiente $\theta_{AC} = \frac{-w_0}{384EI} (9L^3 - 72Lx^2 + 64x^3)$
 $\theta_{CB} = \frac{-w_0 L}{384EI} (24x^2 - 48Lx + 17L^2)$
 $\theta_A = \frac{-3w_0 L^3}{128EI}$ $\theta_B = \frac{7w_0 L^3}{384EI}$

Momento $M_{AC} = \frac{w_0}{8} (3Lx - 4x^2)$ $M_{CB} = \frac{w_0}{8} (L^2 - Lx)$

Cortante $V_{AC} = \frac{w_0}{8} (3L - 8x)$ $V_{CB} = \frac{-w_0 L}{8}$
 $V_A = R_A$ $V_B = -R_B$

Reacciones $R_A = \frac{3w_0 L}{8}$ $R_B = \frac{w_0 L}{8}$

Viga simple apoyada - Carga uniforme parcial en un lado



Deflexión:

$$y_{AC} = \frac{-w_0 x}{24LEI} (a^4 - 4a^3 L + 4a^2 L^2 + 2a^2 x^2 - 4aLx^2 + Lx^3)$$

$$y_{CB} = \frac{-w_0 a^2}{24LEI} (-a^2 L + 4L^2 x + a^2 x - 6Lx^2 + 2x^3)$$

Pendiente:

$$\theta_{AC} = \frac{-w_0}{24LEI} (a^4 - 4a^3 L + 4a^2 L^2 + 6a^2 x^2 - 12aLx^2 + 4Lx^3)$$

$$\theta_{CB} = \frac{-w_0 a^2}{24LEI} (4L^2 + a^2 - 12Lx + 6x^2)$$

Momento:

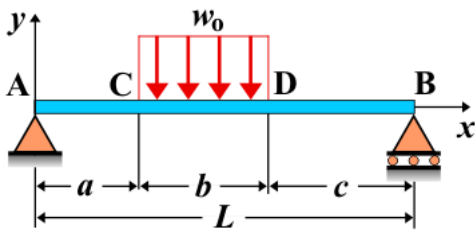
$$M_{AC} = \frac{-w_0}{2L} (a^2 x - 2aLx + Lx^2)$$
 $M_{CB} = \frac{w_0 a^2}{2L} (L - x)$

Cortante:

$$V_{AC} = \frac{-w_0}{2L} (a^2 - 2aL + 2Lx)$$
 $V_{CB} = V_C = V_B = \frac{-w_0 a^2}{2L}$

Reacciones $R_A = \frac{w_0 a}{2L} (2L - a)$ $R_B = \frac{w_0 a^2}{2L}$

Viga simple apoyada - Carga uniforme parcial



$$\text{Deflexión } y_{AC} = \frac{R_A x^3}{6EI} + \alpha x \quad y_{CD} = \frac{R_A x^3}{6EI} - \frac{w_0}{24EI} (x-a)^4 + \alpha x$$

$$y_{DB} = \frac{R_B (L-x)^3}{6EI} + \frac{\beta (L-x)}{L}$$

$$\text{Pendiente: } \theta_{AC} = \frac{R_A x^2}{2EI} + \alpha \quad \theta_{CD} = \frac{R_A x^2}{2EI} - \frac{w_0}{6EI} (x-a)^3 + \alpha$$

$$\theta_{DB} = \frac{-R_B (L-x)^2}{2EI} - \frac{\beta}{L}$$

$$\text{Momento } M_{AC} = R_A x \quad M_{CD} = R_A x - \frac{w_0}{2} (x-a)^2$$

$$M_{DB} = R_B (L-x)$$

$$\text{Cortante } V_{AC} = V_A = V_C = R_A \quad V_{CD} = R_A - w_0 (x-a)$$

$$V_{DB} = V_D = V_B = -R_B$$

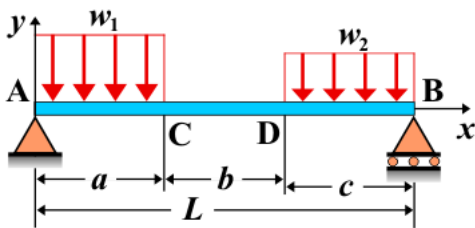
$$\text{Reacciones } R_A = \frac{w_0 b}{2L} (2c + b) \quad R_B = \frac{w_0 b}{2L} (2a + b)$$

Siendo:

$$\alpha = \frac{w_0 b^3 L - 6EI\beta - 3R_B c^2 L - 3R_A L(a+b)^2}{6LEI}$$

$$\beta = \frac{4w_0 ab^3 + 3w_0 b^4 - 8R_A (a+b)^3 - 12R_B c^2 L + 8R_B c^3}{24EI}$$

Viga simple apoyada - Cargas uniformes parciales distintas a cada lado



$$\text{Momento } M_{AC} = R_A x - \frac{w_1 x^2}{2}$$

$$M_{CD} = R_A x - \frac{w_1 a}{2} (2x-a) \quad M_{DB} = R_B (L-x) - \frac{w_2 (L-x)^2}{2}$$

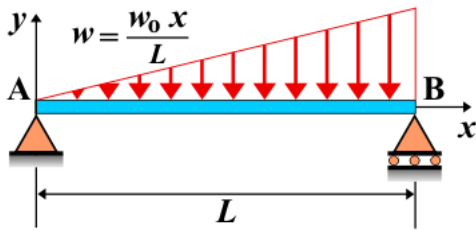
Cortante:

$$V_{AC} = R_A - w_1 x \quad V_{CD} = R_A - w_1 a \quad V_{DB} = -R_B + w_2 (L-x)$$

Reacciones:

$$R_A = \frac{w_1 a (2L-a) + w_2 c^2}{2L} \quad R_B = \frac{w_2 c (2L-c) + w_1 a^2}{2L}$$

Viga simple apoyada - Carga uniformemente creciente en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x}{360LEI} (7L^4 - 10L^2 x^2 + 3x^4)$
 $y_{MAX} = -0,00652 \frac{w_0 L^4}{EI}$ para $x = 0,5193L$

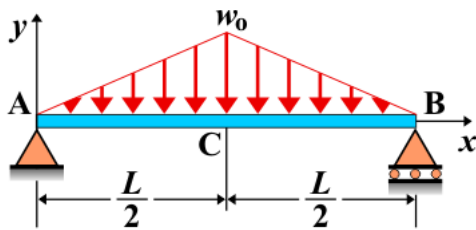
Pendiente $\theta_{AB} = \frac{-w_0}{360LEI} (7L^4 - 30L^2 x^2 + 15x^4)$
 $\theta_A = \frac{-7w_0 L^3}{360EI}$ $\theta_B = \frac{w_0 L^3}{45EI}$

Momento $M_{AB} = \frac{w_0}{6L} (L^2 x - x^3)$

Cortante $V_{AB} = \frac{w_0}{6L} (L^2 - 3x^2)$

Reacciones $R_A = \frac{w_0 L}{6}$ $R_B = \frac{2w_0 L}{6}$

Viga simple apoyada - Carga uniformemente creciente hacia el centro



Deflexión $y_{AC} = \frac{-w_0 x}{960LEI} (5L^2 - 4x^2)^2$
 $y_{CB} = \frac{-w_0 (L-x)}{960LEI} (5L^2 - 4(L-x)^2)^2$
 $y_{MAX} = \frac{-w_0 L^4}{120EI}$ para $x = \frac{L}{2}$

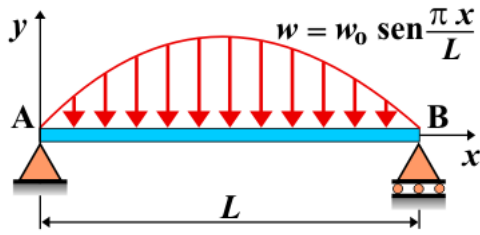
Pendiente $\theta_{AC} = \frac{-w_0}{192LEI} (5L^2 - 4x^2)(L^2 - 4x^2)$
 $\theta_{CB} = \frac{w_0}{192LEI} (5L^2 - 4(L-x)^2)(L^2 - 4(L-x)^2)$
 $\theta_A = -\theta_B = \frac{-5w_0 L^3}{192EI}$

Momento $M_{AC} = \frac{w_0}{12L} (3L^2 x - 4x^3)$
 $M_{CB} = \frac{w_0 (L-x)}{12L} (3L^2 - 4(L-x)^2)$

Cortante $V_{AC} = \frac{w_0}{4L} (L^2 - 4x^2)$ $V_{CB} = \frac{-w_0}{4L} (L^2 - 4(L-x)^2)$

Reacciones $R_A = R_B = \frac{w_0 L}{4}$

Viga simple apoyada - Carga senoidalmente distribuida



Deflexión $y_{AB} = \frac{-w_0 L^4}{\pi^4 EI} \operatorname{sen} \frac{\pi x}{L}$
 $y_{\text{MAX}} = \frac{-w_0 L^4}{\pi^4 EI}$ para $x = \frac{L}{2}$

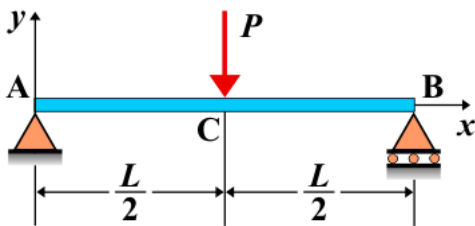
Pendiente $\theta_{AB} = \frac{-w_0 L^3}{\pi^3 EI} \cos \frac{\pi x}{L}$ $\theta_A = -\theta_B = \frac{-w_0 L^3}{\pi^3 EI}$

Momento $M_{AB} = \frac{w_0 L^2}{\pi^2} \operatorname{sen} \frac{\pi x}{L}$

Cortante $V_{AB} = \frac{w_0 L}{\pi} \cos \frac{\pi x}{L}$ $V_A = -V_B = \frac{w_0 L}{\pi}$

Reacciones $R_A = R_B = \frac{w_0 L}{\pi}$

Viga simple apoyada - Carga puntual en el centro



Deflexión $y_{AC} = \frac{-Px}{48EI} (3L^2 - 4x^2)$
 $y_{CB} = \frac{-P(L-x)}{48EI} (3L^2 - 4(L-x)^2)$
 $y_{\text{MAX}} = y_C = \frac{-PL^3}{48EI}$ para $x = \frac{L}{2}$

Pendiente:

$\theta_{AC} = \frac{-P}{16EI} (L^2 - 4x^2)$ $\theta_{CB} = \frac{-P}{16EI} (4x^2 - 8Lx + 3L^2)$

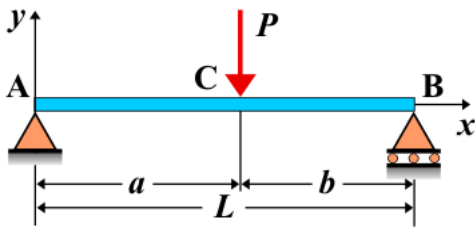
$\theta_A = -\theta_B = \frac{PL^2}{16EI}$

Momento $M_{AC} = \frac{Px}{2}$ $M_{CB} = \frac{P(L-x)}{2}$

Cortante $V_{AC} = V_A = \frac{P}{2}$ $V_{CB} = V_B = \frac{-P}{2}$

Reacciones $R_A = R_B = \frac{P}{2}$

Viga simple apoyada - Carga puntual en cualquier punto



Deflexión $y_{AC} = \frac{-Pbx}{6LEI}(L^2 - b^2 - x^2)$

$y_{CB} = \frac{-Pa(L-x)}{6LEI}[L^2 - a^2 - (L-x)^2]$

Pendiente:

$\theta_{AC} = \frac{-Pb}{6LEI}(L^2 - b^2 - 3x^2)$ $\theta_{CB} = \frac{Pa}{6LEI}[L^2 - a^2 - 3(L-x)^2]$

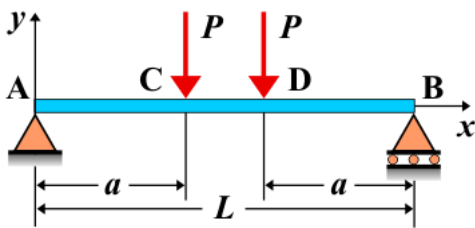
$\theta_A = \frac{-Pb(L^2 - b^2)}{6LEI}$ $\theta_B = \frac{Pa}{6LEI}(L^2 - a^2)$

Momento $M_{AC} = \frac{Pbx}{L}$ $M_{CB} = \frac{Pa(L-x)}{L}$

Cortante $V_{AC} = V_A = \frac{Pb}{L}$ $V_{CB} = V_B = \frac{-Pa}{L}$

Reacciones $R_A = \frac{Pb}{L}$ $R_B = \frac{Pa}{L}$

Viga simple apoyada - Dos cargas puntuales iguales situadas simétricamente



Deflexión $y_{AC} = \frac{-Px}{6EI}(3aL - 3a^2 - x^2)$

$y_{CD} = \frac{-Pa}{6EI}(3Lx - 3x^2 - a^2)$

$y_{DB} = \frac{-P(L-x)}{6EI}[3aL - 3a^2 - (L-x)^2]$

$y_{MAX} = \frac{-Pa}{24EI}(3L^2 - 4a^2)$ para $x = \frac{L}{2}$

Pendiente $\theta_{AC} = \frac{-P}{2EI}(aL - a^2 - x^2)$ $\theta_{CD} = \frac{-Pa}{2EI}(L - 2x)$

$\theta_{DB} = \frac{P}{2EI}[aL - a^2 - (L-x)^2]$

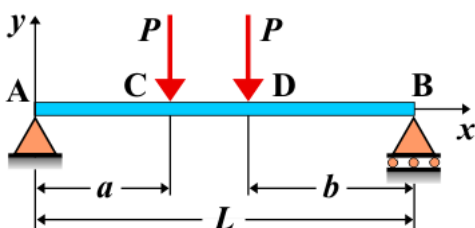
$\theta_A = -\theta_B = \frac{-P(aL - a^2)}{2EI}$

Momento $M_{AC} = Px$ $M_{CD} = Pa$ $M_{DB} = P(L-x)$

Cortante $V_{AC} = P$ $V_{CD} = 0$ $V_{DB} = -P$

Reacciones $R_A = R_B = P$

Viga simple apoyada - Dos cargas puntuales iguales situadas asimétricamente



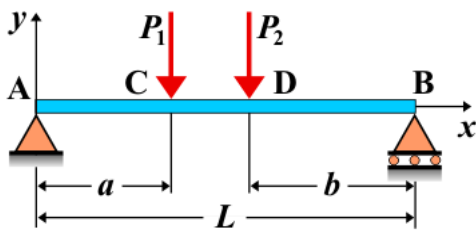
Momento $M_{AC} = R_A x$ $M_{CD} = R_A x - P(x-a)$

$M_{DB} = R_B(L-x)$

Cortante $V_{AC} = R_A$ $V_{CD} = R_A - P$ $V_{DB} = -R_B$

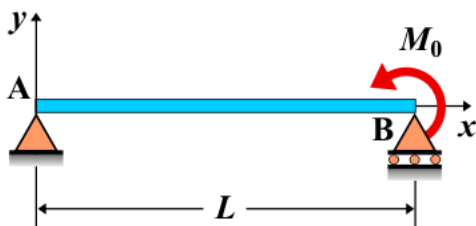
Reacciones $R_A = \frac{P(L-a+b)}{L}$ $R_B = \frac{P(L-b+a)}{L}$

Viga simple apoyada - Dos cargas puntuales desiguales situadas asimétricamente



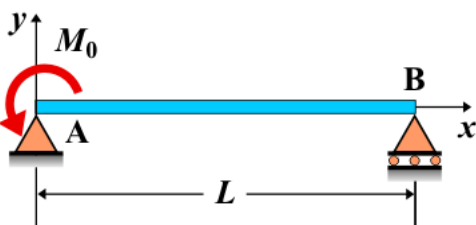
Momento $M_{AC} = R_A x$ $M_{CD} = R_A x - P_1(x - a)$
 $M_{DB} = R_B(L - x)$
 Cortante $V_{AC} = R_A$ $V_{CD} = R_A - P_1$ $V_{DB} = -R_B$
 Reacciones $R_A = \frac{P_1(L - a) + P_2 b}{L}$ $R_B = \frac{P_2(L - b) + P_1 a}{L}$

Viga simple apoyada - Momento antihorario en el lado derecho



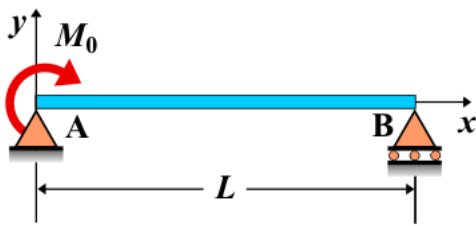
Deflexión $y_{AB} = \frac{-M_0 x}{6LEI} (L^2 - x^2)$
 Pendiente $\theta_{AB} = \frac{-M_0}{6LEI} (L^2 - 3x^2)$
 $\theta_A = \frac{-M_0 L}{6EI}$ $\theta_B = \frac{M_0 L}{3EI}$
 Momento $M_{AB} = \frac{M_0 x}{L}$
 Cortante $V_{AB} = \frac{M_0}{L}$
 Reacciones $R_A = \frac{M_0}{L}$ $R_B = \frac{-M_0}{L}$

Viga simple apoyada - Momento antihorario en el lado izquierdo



Deflexión $y_{AB} = \frac{M_0 x}{6LEI} (2L^2 - 3Lx + x^2)$
 $y_{MAX} = \frac{M_0 L^2}{9\sqrt{3}EI}$ para $x = \left(\frac{3 - \sqrt{3}}{3} \right) L$
 Pendiente $\theta_{AB} = \frac{M_0}{6LEI} (2L^2 - 6Lx + 3x^2)$
 $\theta_A = \frac{M_0 L}{3EI}$ $\theta_B = \frac{-M_0 L}{6EI}$
 Momento $M_{AB} = \frac{-M_0}{L} (L - x)$
 Cortante $V_{AB} = \frac{M_0}{L}$
 Reacciones $R_A = \frac{M_0}{L}$ $R_B = \frac{-M_0}{L}$

Viga simple apoyada - Momento horario en el extremo izquierdo



Deflexión $y_{AB} = \frac{-M_0 x}{6LEI} (2L^2 - 3Lx + x^2)$

$y_{MAX} = \frac{-M_0 L^2}{9\sqrt{3}EI}$ para $x = \left(\frac{3 - \sqrt{3}}{3}\right)L$

Pendiente $\theta_{AB} = \frac{-M_0}{6LEI} (2L^2 - 6Lx + 3x^2)$

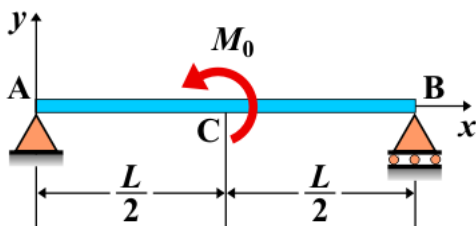
$\theta_A = \frac{-M_0 L}{3EI}$ $\theta_B = \frac{M_0 L}{6EI}$

Momento $M_{AB} = \frac{M_0}{L} (L - x)$

Cortante $V_{AB} = \frac{-M_0}{L}$

Reacciones $R_A = \frac{-M_0}{L}$ $R_B = \frac{M_0}{L}$

Viga simple apoyada - Momento antihorario en el centro



Deflexión $y_{AC} = \frac{-M_0 x}{24LEI} (L^2 - 4x^2)$

$y_{CB} = \frac{M_0 (L - x)}{24LEI} (L^2 - 4(L - x)^2)$

Pendiente $\theta_{AC} = \frac{-M_0}{24LEI} (L^2 - 12x^2)$

$\theta_{CB} = \frac{M_0}{24LEI} (12(L - x)^2 - L^2)$

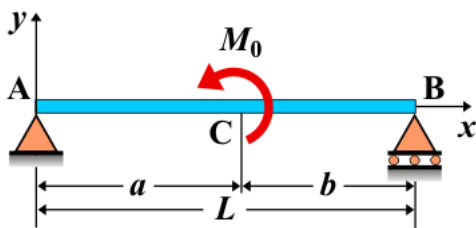
$\theta_A = \frac{-M_0}{6LEI} (L^2 - 3b^2)$ $\theta_B = \frac{M_0}{6LEI} (-L^2 + 3a^2)$

Momento $M_{AC} = \frac{M_0 x}{L}$ $M_{CB} = \frac{-M_0}{L} (L - x)$

Cortante $V_{AC} = \frac{M_0}{L}$ $V_{CB} = \frac{M_0}{L}$

Reacciones $R_A = \frac{M_0}{L}$ $R_B = \frac{-M_0}{L}$

Viga simple apoyada - Momento antihorario en cualquier punto



Deflexión $y_{AC} = \frac{-M_0 x}{6LEI} (L^2 - 3b^2 - x^2)$

$y_{CB} = \frac{M_0 (L-x)}{6LEI} (L^2 - 3a^2 - (L-x)^2)$

Pendiente $\theta_{AC} = \frac{-M_0}{6LEI} (L^2 - 3b^2 - 3x^2)$

$\theta_{CB} = \frac{M_0}{6LEI} (-L^2 + 3a^2 + 3(L-x)^2)$

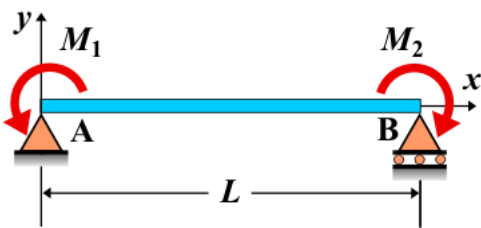
$\theta_A = \frac{-M_0}{6LEI} (L^2 - 3b^2)$ $\theta_B = \frac{M_0}{6LEI} (-L^2 + 3a^2)$

Momento $M_{AC} = \frac{M_0 x}{L}$ $M_{CB} = \frac{-M_0}{L} (L-x)$

Cortante $V_{AC} = \frac{M_0}{L}$ $V_{CB} = \frac{M_0}{L}$

Reacciones $R_A = \frac{M_0}{L}$ $R_B = \frac{-M_0}{L}$

Viga simple apoyada - Dos momentos distintos antihorario + horario en los extremos



Deflexión $y_{AB} = \frac{-x(L-x)}{6LEI} [(M_1 - M_2)x - (2M_1 + M_2)L]$

Pendiente:

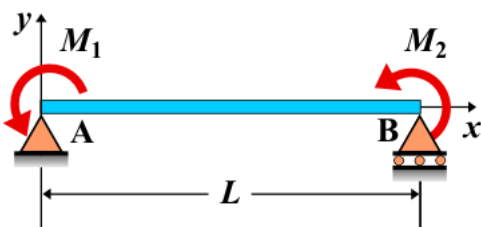
$\theta_{AB} = \frac{1}{6LEI} [(M_1 - M_2)(3x^2 - 2Lx) - (2M_1 + M_2)(2Lx - L^2)]$

Momento $M_{AB} = \frac{1}{L} [(M_1 - M_2)x - LM_1]$

Cortante $V_{AB} = \frac{M_1 - M_2}{L}$

Reacciones $R_A = \frac{M_1 - M_2}{L}$ $R_B = \frac{M_2 - M_1}{L}$

Viga simple apoyada - Dos momentos distintos antihorario en los extremos



Deflexión $y_{AB} = \frac{-x(L-x)}{6LEI} [(M_1 + M_2)x - (2M_1 - M_2)L]$

Pendiente:

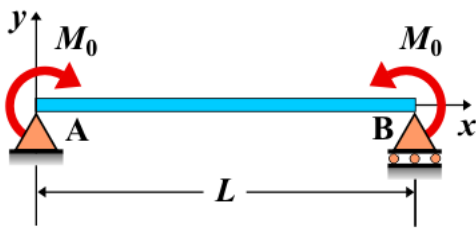
$\theta_{AB} = \frac{1}{6LEI} [(M_1 + M_2)(3x^2 - 2Lx) - (2M_1 - M_2)(2Lx - L^2)]$

Momento $M_{AB} = \frac{1}{L} [(M_1 + M_2)x - LM_1]$

Cortante $V_{AB} = \frac{M_1 + M_2}{L}$

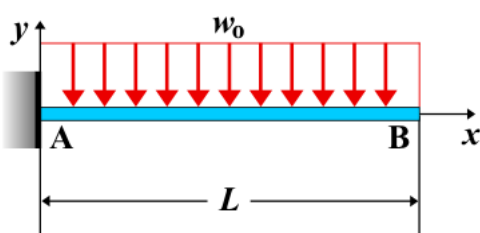
Reacciones $R_A = \frac{M_1 + M_2}{L}$ $R_B = \frac{-M_1 - M_2}{L}$

Viga simple apoyada - Dos momentos iguales horario + antihorario en los extremos



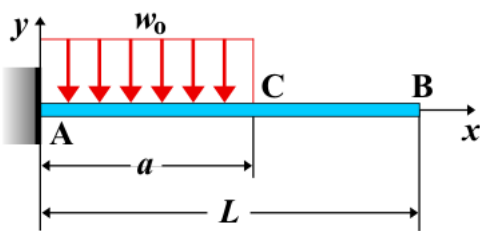
Deflexión $y_{AB} = \frac{-M_0 x}{2EI} (L - x)$
 $y_{MAX} = \frac{-M_0 L^2}{8EI}$ para $x = \frac{L}{2}$
 Pendiente $\theta_{AB} = \frac{-M_0}{2EI} (L - 2x)$ $\theta_A = -\theta_B = \frac{-M_0 L}{2EI}$
 Momento $M_{AB} = M_0$
 Cortante $V_{AB} = 0$
 Reacciones $R_A = R_B = 0$

Viga en voladizo - Carga uniforme en todo el vano



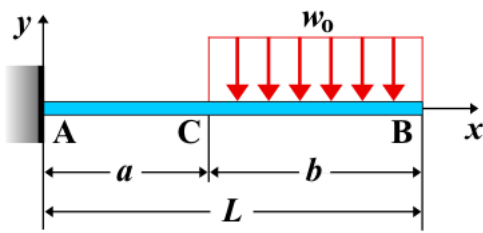
Deflexión $y_{AB} = \frac{-w_0}{24EI} (x^4 - 4Lx^3 + 6L^2x^2)$
 $y_{MAX} = y_B = \frac{-w_0 L^4}{8EI}$ para $x = L$
 Pendiente $\theta_{AB} = \frac{-w_0}{6EI} (x^3 - 3Lx^2 + 3L^2x)$ $\theta_B = \frac{-w_0 L^3}{6EI}$
 Momento $M_{AB} = \frac{-w_0}{2} (L - x)^2$ $M_{MAX} = M_A = \frac{-w_0 L^2}{2}$
 Cortante $V_{AB} = w_0 (L - x)$
 Reacciones $R_A = w_0 L$

Viga en voladizo - Carga uniforme parcial en el lado empotrado



Deflexión $y_{AC} = \frac{-w_0}{24EI} (6a^2x^2 - 4ax^3 + x^4)$
 $y_{CB} = \frac{-w_0 a^3}{24EI} (4x - a)$
 $y_{MAX} = y_B = \frac{-w_0 a^3}{24EI} (4L - a)$
 Pendiente $\theta_{AC} = \frac{-w_0}{6EI} (3a^2x - 3ax^2 + x^3)$
 $\theta_{CB} = \theta_C = \theta_B = \frac{-w_0 a^3}{6EI}$
 Momento $M_{AC} = \frac{-w_0}{2} (a - x)^2$ $M_{CB} = M_C = M_B = 0$
 $M_{MAX} = M_A = \frac{-w_0 a^2}{2}$
 Cortante $V_{AC} = w_0 (a - x)$ $V_{CB} = V_C = V_B = 0$
 Reacciones $R_A = w_0 a$

Viga en voladizo - Carga uniforme parcial en el lado libre



Deflexión $y_{AC} = \frac{-w_0 b x^2}{12EI} (3L + 3a - 2x)$

$y_{CB} = \frac{-w_0}{24EI} (x^4 - 4Lx^3 + 6L^2x^2 - 4a^3x + a^4)$

Pendiente $\theta_{AC} = \frac{-w_0 b x}{2EI} (L + a - x)$

$\theta_{CB} = \frac{-w_0}{6EI} (x^3 - 3Lx^2 + 3L^2x - a^3)$

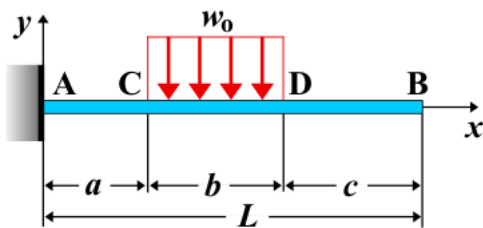
$\theta_B = \frac{-w_0}{6EI} (L^3 - a^3)$

Momento $M_{AC} = \frac{-w_0 b}{2} (L + a - 2x)$ $M_{CB} = \frac{-w_0}{2} (L - x)^2$

Cortante $V_{AC} = V_A = V_C = w_0 b$ $V_{CB} = w_0 (L - x)$

Reacciones $R_A = w_0 b$

Viga en voladizo - Carga uniforme parcial



Deflexión $y_{AC} = \frac{-w_0 b x^2}{12EI} (6a + 3b - 2x)$

$y_{CD} = \frac{-w_0}{24EI} (x^4 - 4(a+b)x^3 + 6(a+b)^2 x^2 - 4a^3 x + a^4)$

$y_{DB} = \frac{-w_0}{24EI} (4x[(a+b)^3 - a^3] - (a+b)^4 + a^4)$

Pendiente $\theta_{AC} = \frac{-w_0 b x}{2EI} (2a + b - x)$

$\theta_{CD} = \frac{-w_0}{6EI} (x^3 - 3(a+b)x^2 + 3(a+b)^2 x - a^3)$

$\theta_{DB} = \frac{-w_0}{6EI} ((a+b)^3 - a^3)$

Momento $M_{AC} = \frac{-w_0 b}{2} (2a + b - 2x)$

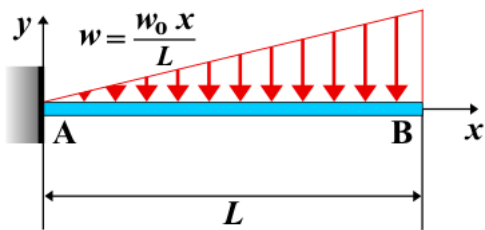
$M_{CD} = \frac{-w_0}{2} (a + b - x)^2$ $M_{DB} = M_D = M_B = 0$

Cortante $V_{AC} = V_A = V_C = w_0 b$ $V_{CD} = w_0 (a + b - x)$

$V_{DB} = V_D = V_B = 0$

Reacciones $R_A = w_0 b$

Viga en voladizo - Carga uniformemente creciente hacia el lado libre en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x^2}{120LEI} (20L^3 - 10L^2 x + x^3)$

$y_{MAX} = \frac{-11w_0 L^4}{120EI}$ para $x = L$

Pendiente $\theta_{AB} = \frac{-w_0 x}{24LEI} (8L^3 - 6L^2 x + x^3)$

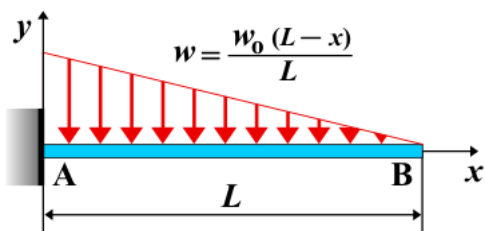
$\theta_B = \frac{-w_0 L^3}{8EI}$

Momento $M_{AB} = \frac{-w_0}{6L} (2L^3 - 3L^2 x + x^3)$

Cortante $V_{AB} = \frac{w_0}{2L} (L^2 - x^2)$

Reacciones $R_A = \frac{w_0 L}{2}$

Viga en voladizo - Carga uniformemente creciente hacia el lado empotrado en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x^2}{120LEI} (10L^3 - 10L^2 x + 5Lx^2 - x^3)$

$y_{MAX} = \frac{w_0 L^4}{30EI}$ para $x=L$

Pendiente $\theta_{AB} = \frac{-w_0 x}{24LEI} (4L^3 - 6L^2 x + 4Lx^2 - x^3)$

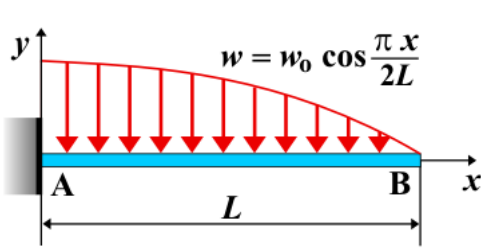
$\theta_B = \frac{-w_0 L^3}{24EI}$

Momento $M_{AB} = \frac{-w_0}{6L} (L - x)^3$

Cortante $V_{AB} = \frac{w_0}{2L} (L - x)^2$

Reacciones $R_A = \frac{w_0 L}{2}$

Viga en voladizo - Carga cosenoidalmente decreciente hacia el lado libre en todo el vano



$$\text{Deflexión } y_{AB} = \frac{-w_0 L}{3\pi^4 EI} \left(48L^3 \cos \frac{\pi x}{2L} - 48L^3 + 3\pi^3 Lx^2 - \pi^3 x^3 \right)$$

$$y_{\text{MAX}} = \frac{-2w_0 L^4}{3\pi^4 EI} (\pi^3 - 24) \text{ para } x = L$$

$$\text{Pendiente } \theta_{AB} = \frac{-w_0 L}{\pi^3 EI} \left(2\pi^2 Lx - \pi^2 x^2 - 8L^2 \sin \frac{\pi x}{2L} \right)$$

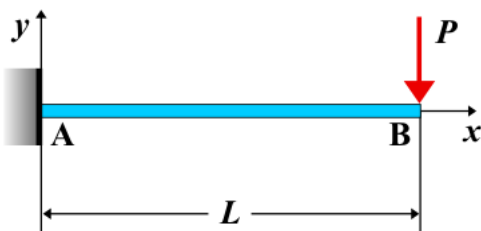
$$\theta_B = \frac{-w_0 L^3}{\pi^3 EI} (\pi^2 - 8)$$

$$\text{Momento } M_{AB} = \frac{-2w_0 L}{\pi^2} \left(\pi L - \pi x - 2L \cos \frac{\pi x}{2L} \right)$$

$$\text{Cortante } V_{AB} = \frac{2w_0 L}{\pi} \left(1 - \sin \frac{\pi x}{2L} \right)$$

$$\text{Reacciones } R_A = \frac{2w_0 L}{\pi}$$

Viga en voladizo - Carga puntual en el extremo libre



$$\text{Deflexión } y_{AB} = \frac{-P}{6EI} (3Lx^2 - x^3)$$

$$y_{\text{MAX}} = y_B = \frac{-PL^3}{3EI}$$

$$\text{Pendiente } \theta_{AB} = \frac{-P}{2EI} (2Lx - x^2)$$

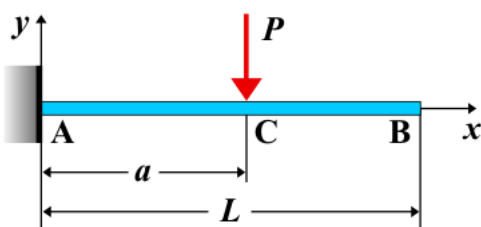
$$\theta_{\text{MAX}} = \theta_B = \frac{-PL^2}{2EI}$$

$$\text{Momento } M_{AB} = -P(L - x) \quad M_{\text{MAX}} = M_A = -PL$$

$$\text{Cortante } V_{AB} = V_A = V_B = P$$

$$\text{Reacciones } R_A = P$$

Viga en voladizo - Carga puntual P en cualquier punto



$$\text{Deflexión } y_{AC} = \frac{-P}{6EI} (3ax^2 - x^3) \quad y_{CB} = \frac{-Pa^2}{6EI} (3x - a)$$

$$y_{\text{MAX}} = y_B = \frac{-Pa^2}{6EI} (3L - a)$$

$$\text{Pendiente } \theta_{AC} = \frac{-P}{2EI} (2ax - x^2) \quad \theta_{CB} = \theta_C = \theta_B = \frac{-Pa^2}{2EI}$$

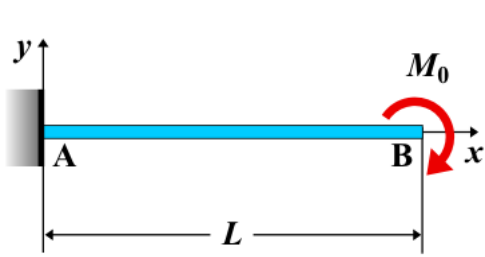
$$\text{Momento } M_{AC} = -P(a - x) \quad M_{CB} = M_C = M_B = 0$$

$$M_{\text{MAX}} = M_A = -Pa$$

$$\text{Cortante } V_{AC} = V_A = V_C = P \quad V_{CB} = V_C = V_B = 0$$

$$\text{Reacciones } R_A = P$$

Viga en voladizo - Momento horario en el extremo libre



Deflexión $y_{AB} = \frac{-M_0 x^2}{2EI}$
 $y_{MAX} = \frac{-M_0 L^2}{2EI}$ para $x = L$

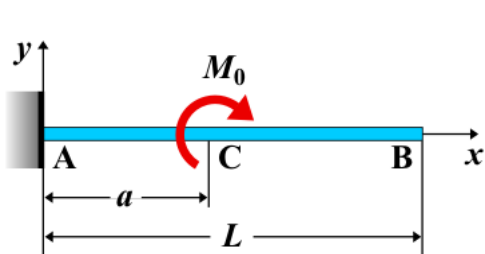
Pendiente $\theta_{AB} = \frac{-M_0 x}{EI}$

Momento $M_{AB} = M_A = M_B = -M_0$

Cortante $V_{AB} = V_A = V_B = 0$

Reacciones $R_A = 0$

Viga en voladizo - Momento horario en cualquier punto



Deflexión $y_{AC} = \frac{-M_0 x^2}{2EI}$ $y_{CB} = \frac{-M_0 a}{2EI}(2x - a)$
 $y_{MAX} = \frac{-M_0 a}{2EI}(2L - a)$ para $x = L$

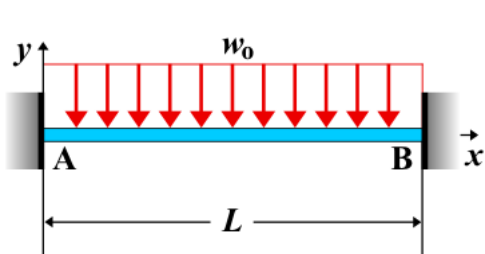
Pendiente $\theta_{AC} = \frac{-M_0 x}{EI}$ $\theta_{CB} = \theta_C = \theta_B = \frac{-M_0 a}{EI}$

Momento $M_{AC} = M_A = -M_0$ $M_{CB} = M_B = 0$

Cortante $V_{AC} = V_A = V_C = 0$ $V_{CB} = V_C = V_B = 0$

Reacciones $R_A = 0$

Viga empotrada - Carga uniforme en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x^2}{24EI}(L - x)^2$

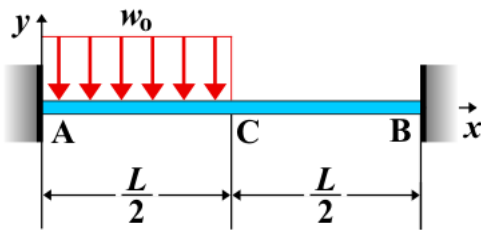
Pendiente $\theta_{AB} = \frac{-w_0 x}{12EI}(L^2 - 3Lx + 2x^2)$

Momento $M_{AB} = \frac{-w_0}{12}(L^2 - 6Lx + 6x^2)$

Cortante $V_{AB} = \frac{w_0}{2}(L - 2x)$

Reacciones $R_A = R_B = \frac{w_0 L}{2}$

Viga empotrada - Carga uniforme en la mitad del vano



$$\text{Deflexión } y_{AC} = \frac{-x^2}{24EI} (w_0 x^2 - 4R_A x - 12M_A)$$

$$y_{CB} = \frac{3(M_B + LR_B)x^2 - R_B x^3}{6EI} + \frac{L^2(3M_B + LR_B) - 3(2M_B + LR_B)Lx}{6EI}$$

$$\text{Pendiente } \theta_{AC} = \frac{-x}{6EI} (w_0 x^2 - 3R_A x - 6M_A)$$

$$\theta_{CB} = \frac{-1}{2EI} [R_B x^2 - 2(M_B + LR_B)x + L(2M_B + LR_B)]$$

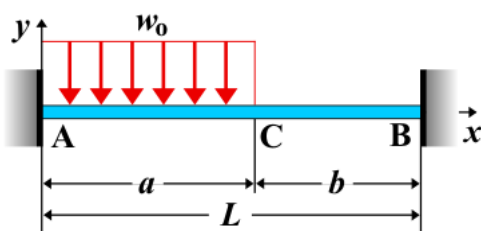
$$\text{Momento } M_{AC} = R_A x + M_A - \frac{w_0 x^2}{2} \quad M_{CB} = R_B(L - x) + M_B$$

$$\text{Cortante } V_{AC} = R_A - w_0 x \quad V_{CB} = -R_B$$

$$\text{Reacciones } R_A = \frac{3w_0 L}{8} - \frac{M_A - M_B}{L} \quad R_B = \frac{w_0 L}{8} + \frac{M_A - M_B}{L}$$

$$\text{Siendo } M_A = \frac{-11w_0 L^2}{192} \quad M_B = \frac{-5w_0 L^2}{192}$$

Viga empotrada - Carga uniforme parcial en un lado



$$\text{Deflexión } y_{AC} = \frac{-x^2}{24EI} (w_0 x^2 - 4R_A x - 12M_A)$$

$$y_{CB} = \frac{3(M_B + LR_B)x^2 - R_B x^3}{6EI} + \frac{L^2(3M_B + LR_B) - 3(2M_B + LR_B)Lx}{6EI}$$

$$\text{Pendiente } \theta_{AC} = \frac{-x}{6EI} (w_0 x^2 - 3R_A x - 6M_A)$$

$$\theta_{CB} = \frac{-1}{2EI} [R_B x^2 - 2(M_B + LR_B)x + L(2M_B + LR_B)]$$

$$\text{Momento } M_{AC} = R_A x + M_A - \frac{w_0 x^2}{2} \quad M_{CB} = R_B(L - x) + M_B$$

$$\text{Cortante } V_{AC} = R_A - w_0 x \quad V_{CB} = -R_B$$

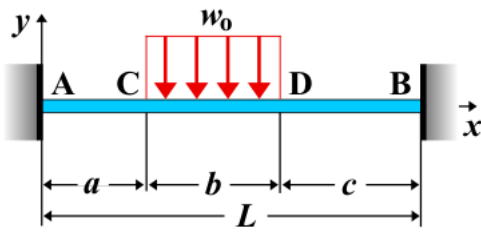
$$\text{Reacciones } R_A = \frac{w_0(L + b)a}{2L} - \frac{M_A - M_B}{L}$$

$$R_B = \frac{w_0 a^2}{2L} + \frac{M_A - M_B}{L}$$

$$\text{Siendo } M_A = \frac{-w_0 a^2}{12L^2} (6L^2 - 8La + 3a^2)$$

$$M_B = \frac{-w_0 a^3}{12L^2} (4L - 3a)$$

Viga empotrada - Carga uniforme parcial



Deflexión $y_{AC} = \frac{x^2}{6EI} (3M_A + R_A x)$

$$y_{CD} = \frac{-1}{24EI} [w_0(x-a)^4 - 4R_A x^3 - 12M_A x^2]$$

$$y_{DB} = \frac{3(M_B + LR_B)x^2 - R_B x^3}{6EI} + \frac{L^2(3M_B + LR_B) - 3(2M_B + LR_B)Lx}{6EI}$$

Pendiente $\theta_{AC} = \frac{x}{2EI} (2M_A + R_A x)$

$$\theta_{CD} = \frac{-1}{6EI} [w_0(x-a)^3 - 3R_A x^2 - 6M_A x]$$

$$\theta_{DB} = \frac{-1}{2EI} [R_B x^2 - 2(M_B + LR_B)x + L(2M_B + LR_B)]$$

Momento $M_{AC} = M_A + R_A x$ $M_{CD} = R_A x + M_A - \frac{w_0(x-a)^2}{2}$

$$M_{DB} = M_B + R_B(L-x)$$

Cortante $V_{AC} = R_A$ $V_{CD} = R_A - w_0(x-a)$ $V_{DB} = -R_B$

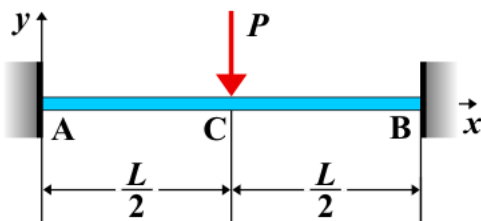
Reacciones $R_A = \frac{w_0(2c+b)b - 2M_A + 2M_B}{2L}$

$$R_B = \frac{w_0(2a+b)b + 2M_A - 2M_B}{2L}$$

Siendo $M_A = \frac{-w_0 b}{24L^2} [b^2(2L-6c-3b) + (6a+3b)(2c+b)^2]$

$$M_B = \frac{-w_0 b}{24L^2} [b^2(2L-6a-3b) + (6c+3b)(2a+b)^2]$$

Viga empotrada - Carga puntual en el centro



Deflexión $y_{AC} = \frac{-Px^2}{48EI} (3L-4x)$ $y_{CB} = \frac{-P(L-x)^2}{48EI} (4x-L)$

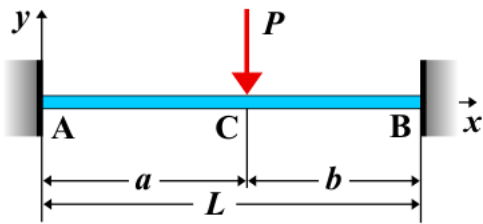
Pendiente $\theta_{AC} = \frac{-Px}{8EI} (L-2x)$ $\theta_{CB} = \frac{-P}{8EI} (L^2 - 3Lx + 2x^2)$

Momento $M_{AC} = \frac{-P}{8} (L-4x)$ $M_{CB} = \frac{P}{8} (3L-4x)$

Cortante $V_{AC} = \frac{P}{2}$ $V_{CB} = \frac{-P}{2}$

Reacciones $R_A = R_B = \frac{P}{2}$

Viga empotrada - Carga puntual en cualquier punto



Deflexión $y_{AC} = \frac{-Pb^2x^2}{6EIL^3}(3aL - 3ax - bx)$

$y_{CB} = \frac{-Pa^2(L-x)^2}{6EIL^3}(3bx - aL + ax)$

Pendiente $\theta_{AC} = \frac{-Pb^2x}{2EIL^3}(2aL - 3ax - bx)$

$\theta_{CB} = \frac{Pa^2(L-x)}{2EIL^3}[x(3b+a) - L^2]$

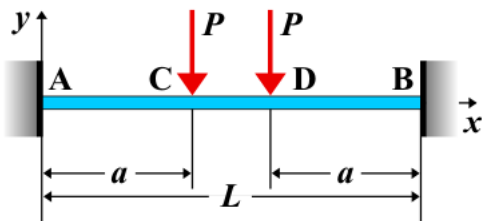
Momento $M_{AC} = \frac{-Pb^2x}{L^3}(aL - 3ax - bx)$

$M_{CB} = \frac{Pa^2}{L^3}(L^2 + bL - Lx - 2bx)$

Cortante $V_{AC} = \frac{Pb^2}{L^3}(L + 2a)$ $V_{CB} = \frac{-Pa^2}{L^3}(L + 2b)$

Reacciones $R_A = \frac{Pb^2}{L^3}(L + 2a)$ $R_B = \frac{Pa^2}{L^3}(L + 2b)$

Viga empotrada - Dos cargas puntuales iguales situadas simétricamente



Deflexión $y_{AC} = \frac{-Px^2}{6EIL}(3aL - 3a^2 - Lx)$

$y_{CD} = \frac{-Pa^2}{6EIL}(3Lx - 3x^2 - aL)$

$y_{DB} = \frac{-P(L-x)^2}{6EIL}(3aL - 3a^2 - L(L-x))$

Pendiente $\theta_{AC} = \frac{-Px}{2EIL}(2aL - 2a^2 - Lx)$ $\theta_{CD} = \frac{-Pa^2}{2EIL}(L - 2x)$

$\theta_{DB} = \frac{P(L-x)}{2EIL}[2aL - 2a^2 - L(L-x)]$

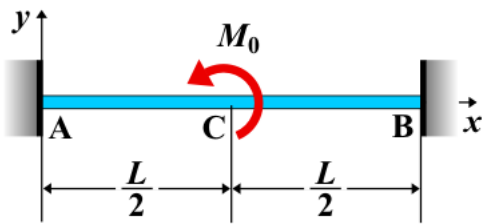
Momento $M_{AC} = \frac{P}{L}(Lx - aL + a^2)$

$M_{CD} = \frac{Pa^2}{L}$ $M_{DB} = \frac{P}{L}(L^2 - Lx - La + a^2)$

Cortante $V_{AC} = P$ $V_{CD} = 0$ $V_{DB} = -P$

Reacciones $R_A = R_B = P$

Viga empotrada - Momento antihorario en el centro



Deflexión $y_{AC} = \frac{M_0 x^2}{8LEI} (2x - L)$

$y_{CB} = \frac{-M_0}{8LEI} (5Lx^2 - 2x^3 - 4L^2x + L^3)$

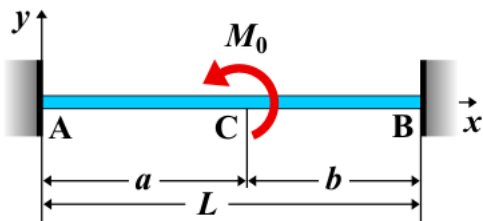
Pendiente $\theta_{AC} = \frac{M_0 x}{4LEI} (3x - L)$ $\theta_{CB} = \frac{-M_0}{8LEI} (10Lx - 6x^2 - 4L^2)$

Momento $M_{AC} = \frac{M_0}{4L} (6x - L)$ $M_{CB} = \frac{-M_0}{4L} (5L - 6x)$

Cortante $V_{AB} = \frac{3M_0}{2L}$

Reacciones $R_A = \frac{3M_0}{2L}$ $R_B = \frac{-3M_0}{2L}$

Viga empotrada - Momento antihorario en cualquier punto



Deflexión:

$y_{AC} = \frac{-M_0 b x^2}{2L^3 EI} (2aL - 2ax - bL)$ $y_{CB} = \frac{M_0 a (L - x)^2}{2L^3 EI} (2bx - aL)$

Pendiente:

$\theta_{AC} = \frac{-M_0 b x}{L^3 EI} (2aL - 3ax - bL)$ $\theta_{CB} = \frac{M_0 a (L - x)}{L^3 EI} (L^2 - 3bx)$

Momento:

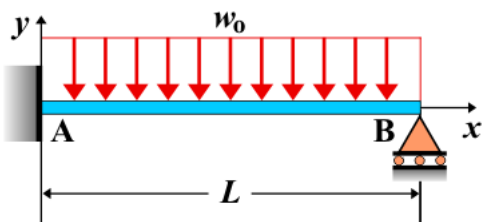
$M_{AC} = \frac{-M_0 b}{L^3} (2aL - 6ax - bL)$ $M_{CB} = \frac{M_0 a}{L^3} (6bx - 4bL - aL)$

Cortante $V_{AB} = \frac{6M_0 ab}{L^3}$

Reacciones $R_A = \frac{6M_0 ab}{L^3}$ $R_B = \frac{-6M_0 ab}{L^3}$

Siendo $M_A = \frac{-M_0 b}{L^2} (2a - b)$ $M_B = \frac{M_0 a}{L^2} (2b - a)$

Viga empotrada / apoyada - Carga uniforme en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x^2}{48EI} (3L^2 - 5Lx + 2x^2)$

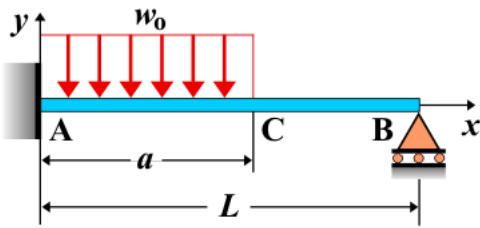
Pendiente $\theta_{AB} = \frac{-w_0 x}{48EI} (6L^2 - 15Lx + 8x^2)$

Momento $M_{AB} = \frac{-w_0}{8} (L^2 - 5Lx + 4x^2)$

Cortante $V_{AB} = \frac{w_0}{8} (5L - 8x)$

Reacciones $R_A = \frac{5w_0 L}{8}$ $R_B = \frac{3w_0 L}{8}$

Viga empotrada / apoyada - Carga uniforme parcial en el lado empotrado



Deflexión:

$$y_{AC} = \frac{8R_B L(L-x)^3 - 2w_0 L(a-x)^4 - w_0 a^3(L-x)(L+3b)}{48EIL}$$

$$y_{CB} = \frac{8R_B L(L-x)^3 - w_0 a^3(L-x)(L+3b)}{48EIL}$$

Pendiente:

$$\theta_{AC} = \frac{-24R_B L(L-x)^2 + 8w_0 L(a-x)^3 + w_0 a^3(L+3b)}{48EIL}$$

$$\theta_{CB} = \frac{-24R_B L(L-x)^2 + w_0 a^3(L+3b)}{48EIL}$$

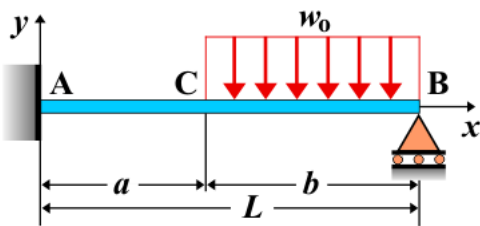
Momento $M_{AC} = \frac{2R_B(L-x) - w_0(a-x)^2}{2}$ $M_{CB} = R_B(L-x)$

Cortante $V_{AC} = -R_B + w_0(a-x)$ $V_{CB} = -R_B$

Reacciones $R_A = \frac{w_0(L+b)a - 2M_A}{2L}$ $R_B = \frac{w_0 a^2 + 2M_A}{2L}$

Siendo $M_A = \frac{-w_0(L+b)^2 a^2}{8L^2}$

Viga empotrada / apoyada - Carga uniforme parcial en el lado apoyado



Deflexión $y_{AC} = \frac{x^2}{6EI}(R_A x + 3M_A)$

$$y_{CB} = \frac{4R_B L(L-x)^3 - w_0 L(L-x)^4}{24EIL} + \frac{-w_0 b^2(L-x)(bL + 3ab + 6a^2)}{48EIL}$$

Pendiente $\theta_{AC} = \frac{x}{2EI}(R_A x + 2M_A)$

$$\theta_{CB} = \frac{-3R_B L(L-x)^2 + w_0 L(L-x)^3}{6EIL} + \frac{w_0 b^2(bL + 3ab + 6a^2)}{48EIL}$$

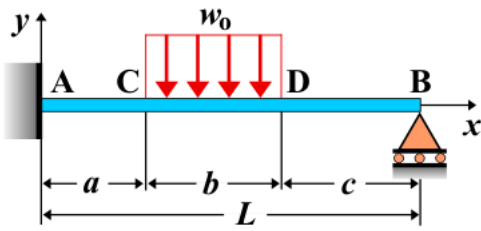
Momento $M_{AC} = R_A x + M_A$ $M_{CB} = \frac{2R_B(L-x) - w_0(L-x)^2}{2}$

Cortante $V_{AC} = R_A$ $V_{CB} = -R_B + w_0(L-x)$

Reacciones $R_A = \frac{w_0 b^2 - 2M_A}{2L}$ $R_B = \frac{w_0(2a+b)b + 2M_A}{2L}$

Siendo $M_A = \frac{-w_0 b^2}{16L^2} [(2L+b)(L+a) - b^2]$

Viga empotrada / apoyada - Carga uniforme parcial



Deflexión $y_{AC} = \frac{x^2}{6EI} (R_A x + 3M_A)$

$$y_{CD} = \frac{4R_B(L-x)^3 - w_0(L-x-c)^4}{24EI} + \frac{-w_0 b(L-x)[2b^2 L - 3b^2(2a+b) + 3(2c+b)(2a+b)^2]}{96EIL}$$

$$y_{DB} = \frac{R_B(L-x)^3}{6EI} + \frac{-w_0 b(L-x)[2b^2 L - 3b^2(2a+b) + 3(2c+b)(2a+b)^2]}{96EIL}$$

Pendiente $\theta_{AC} = \frac{x}{2EI} (R_A x + 2M_A)$

$$\theta_{CD} = \frac{-3R_B(L-x)^2 + w_0(L-x-c)^3}{6EI} + \frac{w_0 b[2b^2 L - 3b^2(2a+b) + 3(2c+b)(2a+b)^2]}{96EIL}$$

$$\theta_{DB} = \frac{-R_B(L-x)^2}{2EI} + \frac{w_0 b[2b^2 L - 3b^2(2a+b) + 3(2c+b)(2a+b)^2]}{96EIL}$$

Momento $M_{AC} = R_A x + M_A$

$$M_{CD} = \frac{2R_B(L-x) - w_0(L-x-c)^2}{2} \quad M_{DB} = R_B(L-x)$$

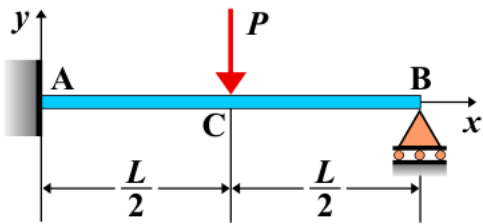
Cortante $V_{AC} = R_A$ $V_{CD} = w_0(L-x-c) - R_B$ $V_{DB} = -R_B$

Reacciones $R_A = \frac{w_0 b(2c+b) - 2M_A}{2L}$

$$R_B = \frac{w_0(2a+b)b + 2M_A}{2L}$$

Siendo $M_A = \frac{-w_0(2c+b)(2a+b)b[(2L+2c+b)(2a+b) - b^2]}{16L^2}$

Viga empotrada / apoyada - Carga puntual en el centro



Deflexión:

$$y_{AC} = \frac{-Px^2}{96EI}(9L-11x) \quad y_{CB} = \frac{-P(L-x)}{96EI}(3L^2-5(L-x)^2)$$

Pendiente:

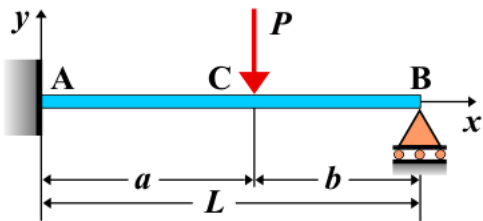
$$\theta_{AC} = \frac{-Px}{32EI}(6L-11x) \quad \theta_{CB} = \frac{-P}{32EI}(4L^2-10Lx+5x^2)$$

Momento $M_{AC} = \frac{-P}{16}(3L-11x) \quad M_{CB} = \frac{5P}{16}(L-x)$

Cortante $V_{AC} = \frac{11P}{16} \quad V_{CB} = \frac{-5P}{16}$

Reacciones $R_A = \frac{11P}{16} \quad R_B = \frac{5P}{16}$

Viga empotrada / apoyada - Carga puntual en cualquier punto



Deflexión $y_{AC} = \frac{-Pbx^2}{12EIL^3}(3L^3-3b^2L-3L^2x+b^2x)$

$$y_{CB} = \frac{-Pa^2(L-x)}{12EIL^3}(3bL^2-(2L+b)(L-x)^2)$$

Pendiente $\theta_{AC} = \frac{-Pbx}{4EIL^3}(2L^3-2b^2L-3L^2x+b^2x)$

$$\theta_{CB} = \frac{-Pa^2}{4EIL^3}(2L^3-4L^2x-2bLx+2Lx^2+bx^2)$$

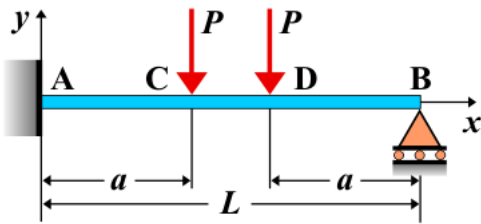
Momento:

$$M_{AC} = \frac{-Pb}{2L^3}(L^3-b^2L-3L^2x+b^2x) \quad M_{CB} = \frac{Pa^2}{2L^3}(L-x)(2L+b)$$

Cortante $V_{AC} = \frac{Pb}{2L^3}(3L^2-b^2) \quad V_{CB} = \frac{-Pa^2}{2L^3}(2L+b)$

Reacciones $R_A = \frac{Pb}{2L^3}(3L^2-b^2) \quad R_B = \frac{Pa^2}{2L^3}(2L+b)$

Viga empotrada / apoyada - Dos cargas puntuales iguales situadas simétricamente



Deflexión:

$$y_{AC} = \frac{Px^2}{12EIL^2} \left[(3a^2 - 3aL - 2L^2)(L - x) + 2L(3a^2 - 3aL + L^2) \right]$$

$$y_{CD} = \frac{-Pa(3(L-a)(L-x)^3 - 6L^2(L-x)^2)}{12EIL^2} + \frac{-Pa[3L^2(L+a)(L-x) - 2L^2a^2]}{12EIL^2}$$

$$y_{DB} = \frac{-P(L-x)}{12EIL^2} \left[(3aL - 3a^2 - 2L^2)(L-x)^2 + 3aL^2(L-a) \right]$$

Pendiente:

$$\theta_{AC} = \frac{Px}{12EIL^2} \left[(3a^2 - 3aL - 2L^2)(2L - 3x) + 4L(3a^2 - 3aL + L^2) \right]$$

$$\theta_{CD} = \frac{-Pa}{4EIL^2} \left[-3(L-a)(L-x)^2 + 4L^2(L-x) - L^2(L+a) \right]$$

$$\theta_{DB} = \frac{P}{4EIL^2} \left[(3aL - 3a^2 - 2L^2)(L-x)^2 + aL^2(L-a) \right]$$

Momento $M_{AC} = \frac{P}{2L^2} \left[3a^2L - 3aL^2 + x(2L^2 + 3aL - 3a^2) \right]$

$$M_{CD} = \frac{-Pa}{2L^2} \left[3(L-a)(L-x) - 2L^2 \right]$$

$$M_{DB} = \frac{-P(L-x)}{2L^2} (3aL - 3a^2 - 2L^2)$$

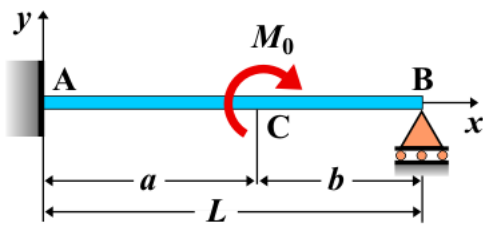
Cortante $V_{AC} = \frac{P}{2L^2} (2L^2 + 3aL - 3a^2)$ $V_{CD} = \frac{3Pa(L-a)}{2L^2}$

$$V_{DB} = \frac{P}{2L^2} (3aL - 3a^2 - 2L^2)$$

Reacciones $R_A = \frac{P}{2L^2} (2L^2 + 3aL - 3a^2)$

$$R_B = \frac{P}{2L^2} (3a^2 + 2L^2 - 3aL)$$

Viga empotrada / apoyada - Momento horario en cualquier punto



$$\text{Deflexión: } y_{AC} = \frac{-M_0 x^2}{4EIL^3} [2b^2 L - (L-x)(L^2 - b^2)]$$

$$y_{CB} = \frac{-M_0 a(L-x)}{4EIL^3} [-4L^3 - ((L-x)^2 - 3L^2)(L+b)]$$

$$\text{Pendiente } \theta_{AC} = \frac{-M_0 x}{4EIL^3} [4b^2 L - (2L-3x)(L^2 - b^2)]$$

$$\theta_{CB} = \frac{-M_0 a}{4EIL^3} [4L^3 - 3(L+b)(x^2 - 2Lx)]$$

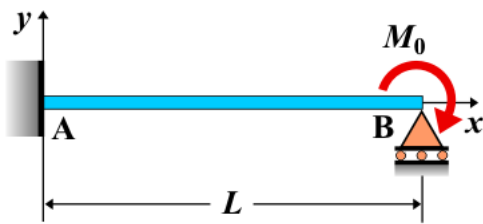
$$\text{Momento } M_{AC} = \frac{-M_0}{2L^3} [2b^2 L - (L-3x)(L^2 - b^2)]$$

$$M_{CB} = \frac{3M_0 a}{2L^3} (L+b)(L-x)$$

$$\text{Cortante } V_{AB} = \frac{-3M_0 a}{2L^3} (L+b)$$

$$\text{Reacciones } R_A = \frac{-3M_0 a}{2L^3} (L+b) \quad R_B = \frac{3M_0 a}{2L^3} (L+b)$$

Viga empotrada / apoyada - Momento horario en el lado apoyado



$$\text{Deflexión } y_{AB} = \frac{M_0 x^2(L-x)}{4EIL}$$

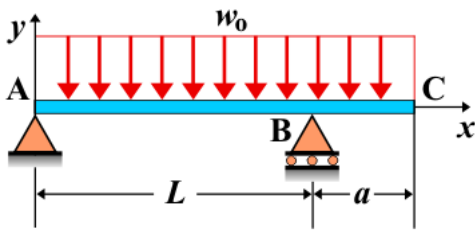
$$\text{Pendiente } \theta_{AB} = \frac{M_0 x(2L-3x)}{4EIL}$$

$$\text{Momento } M_{AB} = \frac{M_0(L-3x)}{2L}$$

$$\text{Cortante } V_{AB} = \frac{-3M_0}{2L}$$

$$\text{Reacciones } R_A = \frac{-3M_0}{2L} \quad R_B = \frac{3M_0}{2L}$$

Viga con vano lateral - Carga uniforme en todo el vano



Deflexión $y_{AB} = \frac{-w_0 x}{24LEI} (L^4 - 2L^2 x^2 + Lx^3 - 2a^2 L^2 + 2a^2 x^2)$

$y_{BC} = \frac{-w_0 x_1}{24EI} (4a^2 L - L^3 + 6a^2 x_1 - 4ax_1^2 + x_1^3)$

Pendiente $\theta_{AB} = \frac{-w_0}{24LEI} (L^4 - 6L^2 x^2 + 4Lx^3 - 2a^2 L^2 + 6a^2 x^2)$

$\theta_{BC} = \frac{-w_0}{24EI} (4a^2 L - L^3 + 12a^2 x_1 - 12ax_1^2 + 4x_1^3)$

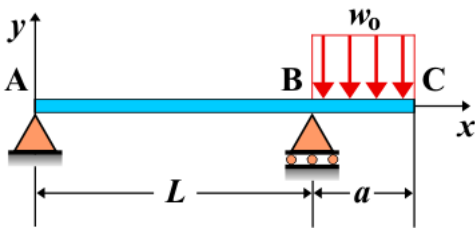
Momento $M_{AB} = \frac{w_0 x}{2L} (L^2 - Lx - a^2)$ $M_{BC} = \frac{-w_0}{2} (a - x_1)^2$

Cortante $V_{AB} = \frac{w_0}{2L} (L^2 - 2Lx - a^2)$ $V_{BC} = w_0 (a - x_1)$

Reacciones $R_A = \frac{w_0}{2L} (L^2 - a^2)$ $R_B = \frac{w_0}{2L} (L + a)^2$

Siendo $x_1 = x - L$

Viga con vano lateral - Carga uniforme sobre el saliente



Deflexión $y_{AB} = \frac{w_0 a^2 x}{12LEI} (L^2 - x^2)$

$y_{BC} = \frac{-w_0 x_1}{24EI} (4a^2 L + 6a^2 x_1 - 4ax_1^2 + x_1^3)$

Pendiente $\theta_{AB} = \frac{w_0 a^2}{12LEI} (L^2 - 3x^2)$

$\theta_{BC} = \frac{-w_0}{6EI} (a^2 L + 3a^2 x_1 - 3ax_1^2 + x_1^3)$

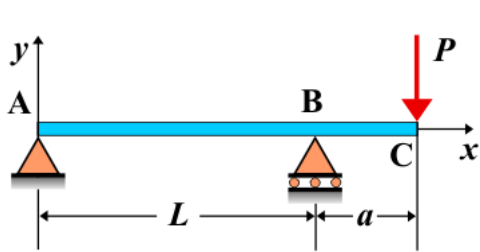
Momento $M_{AB} = \frac{-w_0 a^2 x}{2L}$ $M_{BC} = \frac{-w_0}{2} (a - x_1)^2$

Cortante $V_{AB} = \frac{-w_0 a^2}{2L}$ $V_{BC} = w_0 (a - x_1)$

Reacciones $R_A = \frac{-w_0 a^2}{2L}$ $R_B = \frac{w_0 (2L + a)a}{2L}$

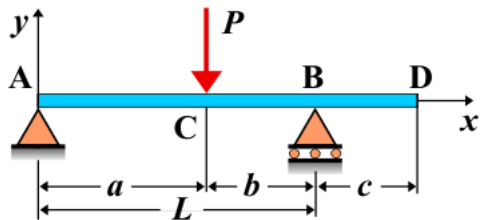
Siendo $x_1 = x - L$

Viga con vano lateral - Carga puntual en el extremo saliente



$$\begin{aligned} \text{Deflexión} \quad y_{AB} &= \frac{Pax}{6LEI}(L^2 - x^2) & y_{BC} &= \frac{-Px_1}{6EI}(2aL + 3ax_1 - x_1^2) \\ \text{Pendiente} \quad \theta_{AB} &= \frac{Pa}{6LEI}(L^2 - 3x^2) & \theta_{BC} &= \frac{-P}{6EI}(2aL + 6ax_1 - 3x_1^2) \\ \text{Momento} \quad M_{AB} &= \frac{-Pax}{L} & M_{BC} &= -P(a - x_1) \\ \text{Cortante} \quad V_{AB} &= \frac{-Pa}{L} & V_{BC} &= P \\ \text{Reacciones} \quad R_A &= \frac{-Pa}{L} & R_B &= \frac{P(L+a)}{L} \\ \text{Siendo } x_1 &= x - L \end{aligned}$$

Viga con vano lateral - Carga puntual entre los apoyos



$$\begin{aligned} \text{Deflexión} \quad y_{AC} &= \frac{-Pbx}{6LEI}(L^2 - b^2 - x^2) \\ y_{CB} &= \frac{-Pa(L-x)}{6LEI}(2Lx - a^2 - x^2) \\ y_{BD} &= \frac{Pabx_1}{6LEI}(L+a) \\ \text{Pendiente} \quad \theta_{AC} &= \frac{-Pb}{6LEI}(L^2 - b^2 - 3x^2) \\ \theta_{CB} &= \frac{-Pa}{6LEI}(2L^2 - 6Lx + a^2 + 3x^2) & \theta_{BD} &= \frac{Pab(L+a)}{6LEI} \\ \text{Momento} \quad M_{AC} &= \frac{Pbx}{L} & M_{CB} &= \frac{Pa}{L}(L-x) & M_{BD} &= 0 \\ \text{Cortante} \quad V_{AC} &= \frac{Pb}{L} & V_{CB} &= \frac{-Pa}{L} & V_{BD} &= 0 \\ \text{Reacciones} \quad R_A &= \frac{Pb}{L} & R_B &= \frac{Pa}{L} \\ \text{Siendo } x_1 &= x - L \end{aligned}$$

Pruebe **Calculador de deformación de Vigas** en vaxasoftware.com