Beam loads

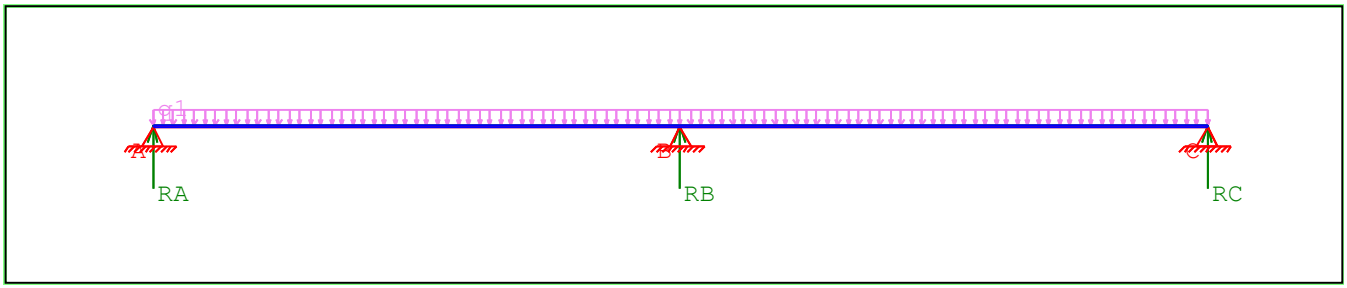
Load start	[mm]	$x_s := 0$
Load length	[mm]	$x_l := 5000$
Distribuited load - first span	[N/mm]	$q1 := 1$
Distribuited load - second span	[N/mm]	$q2 := 0$
Expression Blocklast - first span		$p1(x) := q1 \cdot H(x - x_s) - q1 \cdot H(x - x_l)$
Expression Blocklast - second span		$p2(x) := q2 \cdot H(x - x_s) - q2 \cdot H(x - x_l)$
First span length	[mm]	$L1 := 5000$
Second span length	[mm]	$L2 := 5000$
Cross-section width	[mm]	$b := 100$
Cross-section height	[mm]	$h := 200$
Elastic modulus	[Nmm²]	$E := 11000$
Shear modulus	[N/mm²]	$G := 690$
Cross-section area	[mm²]	$A := b \cdot h$
Moment inertia	[mm4]	$I := \frac{b \cdot h^3}{12}$
Bending stiffness	[Nmm²]	$EI := E \cdot I = 7,3333 \cdot 10^{11}$
Shear correction factor	[-]	$ks := 1,2$
Shear corrected stiffness	[N]	$GAc := \frac{G \cdot A}{ks} = 1,15 \cdot 10^7$

ELASTIC CURVE

Deflection expression - first span	$u1(x) := v1(x) - \frac{EI}{GAc} \cdot v1''(x)$
Deflection expression - second span	$u2(x) := v2(x) - \frac{EI}{GAc} \cdot v2''(x)$
	$u1\left(\frac{L1}{2}\right) = 8,0651$ $\quad$ $u2\left(\frac{L2}{2}\right) = -3,3039$
Moment expression - first span	$M1(x) := -(v1''(x) \cdot EI)$
Moment expression - second span	$M2(x) := -(v2''(x) \cdot EI)$
	$M1(L1) = -1,5506 \cdot 10^6$ $\quad$ $M2(0) = -1,5506 \cdot 10^6$
Shear force expression - first span	$V1(x) := -(v1'''(x) \cdot EI)$
Shear force expression - second span	$V2(x) := -(v2'''(x) \cdot EI)$

STATIC SYSTEM

Beam:



Expressions:

- Shear force

$$V(x) := \begin{cases} V1(x) & \text{if } (x > 0) \wedge (x < L1) \\ V2(x - L1) & \text{if } x \geq L1 \\ 0 & \text{otherwise} \end{cases}$$

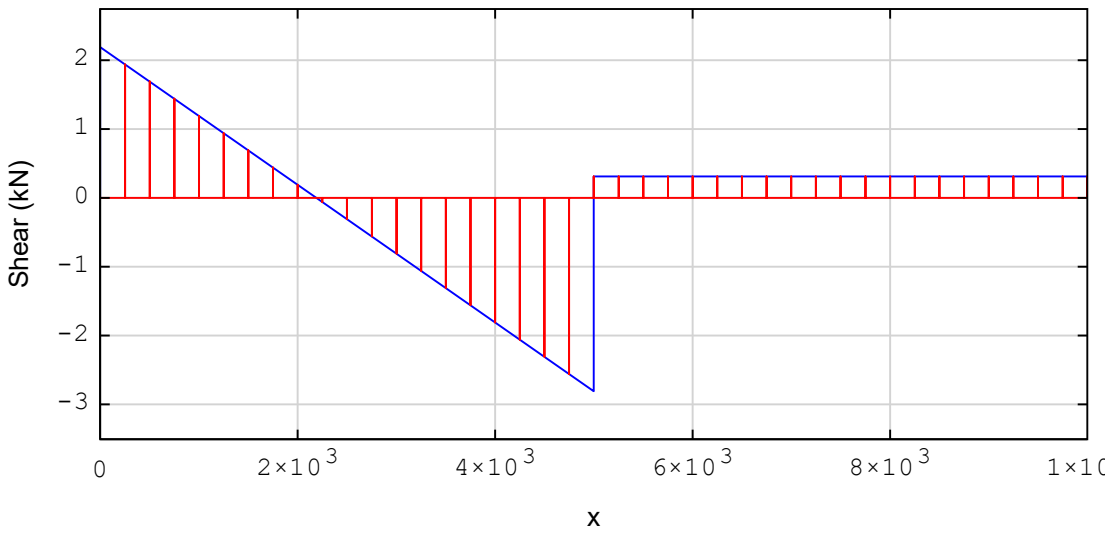
- Moment

$$M(x) := \begin{cases} M1(x) & \text{if } (x > 0) \wedge (x < L1) \\ M2(x - L1) & \text{if } x \geq L1 \\ 0 & \text{otherwise} \end{cases}$$

- Deflection

$$u(x) := \begin{cases} u1(x) & \text{if } (x > 0) \wedge (x < L1) \\ u2(x - L1) & \text{if } x \geq L1 \\ 0 & \text{otherwise} \end{cases}$$

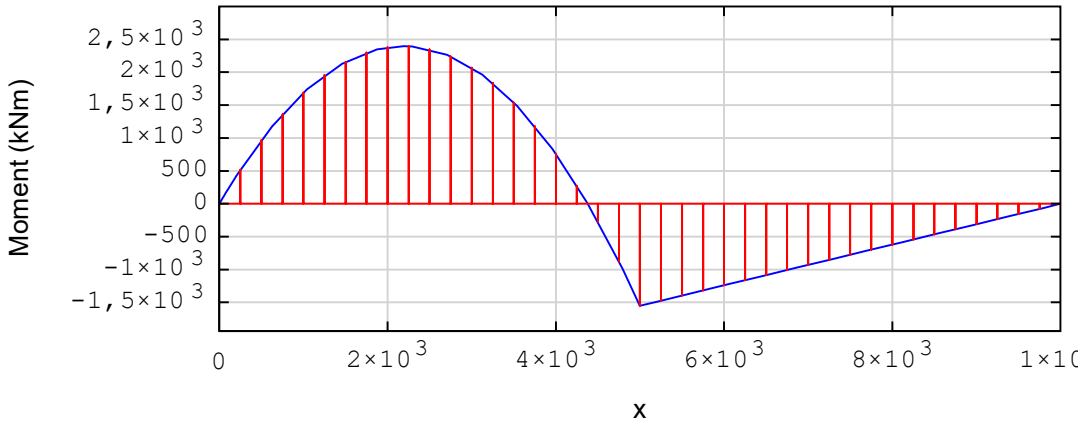
Shear Diagram



$V_{max} = 2189,8731$

$V_{min} = -2810,1269$

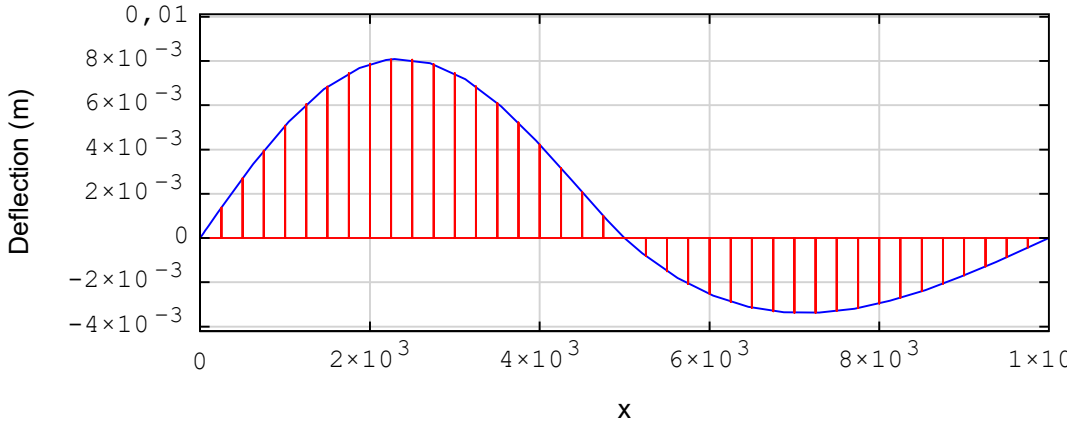
Moment Diagram



$M_{max} = 2,3978 \cdot 10^{6}$

$M_{min} = -1,5506 \cdot 10^{6}$

Deflection Diagram



$\Delta_{max} = 0,0007$

$\Delta_{min} = -0,0003$

Reactions

$R_A := V1(0) = 2189,8731$ $R_B := (-V1(L1) + V2(0)) = 3120,2537$ $R_C := -V2(L2) = -310,1269$