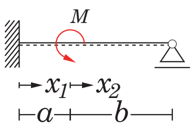
Tabelle A.31.: Linksseitig eingesp. Einfeldträger mit var. Moment



Randwerte:

$V_{10} = \frac{3Ma(a+2b)}{2(a+b)^3}$ `V10:3*M*a*(a+2*b)/(2*(a+b)^3)`

$M_{10} = \frac{M(-a^2-2ab+2b^2)}{2(a+b)^3}$ `M10:M*(-a^2-2*a*b+2*b^2)/(2*(a+b)^2)`

$\varphi_{10} = 0$ `phi10:0`

$w_{10} = 0$ `w10:0`

$V_{20} = \frac{3Ma(a+2b)}{2(a+b)^3}$ `V20:3*M*a*(a+2*b)/(2*(a+b)^3)`

$M_{20} = -\frac{3Mab(a+2b)}{2(a+b)^3}$ `M20:-3*M*a*b*(a+2*b)/(2*(a+b)^3)`

$\varphi_{20} = \frac{Ma(a^3+4b^3)}{4EI(a+b)^3}$ `phi20:M*a*(a^3+4*b^3)/(4*EI*(a+b)^3)`

$w_{20} = -\frac{Ma^2b(-a^2+2b^2)}{4EI(a+b)^3}$ `w20:-M*a^2*b*(-a^2+2*b^2)/(4*EI*(a+b)^3)`

Auflagerkräfte:

$A = V_{10} = \frac{3Ma(a+2b)}{2(a+b)^3}$ `A:3*M*a(a+2*b)/(2*(a+b)^3)`

$B = -V_{10} = \frac{-3Ma(a+2b)}{2(a+b)^3}$ `B:-3*M*a*(a+2*b)/(2*(a+b)^3)`

Funktionsgleichungen:

$V(x_1) = \frac{3Ma(a+2b)}{2(a+b)^3}$ `V10:3*M*a*(a+2*b)/(2*(a+b)^3)`

$M(x_1) = \frac{M(6abx_1+3a^2x_1+2b^3-3a^2b-a^3)}{2(a+b)^3}$ `Mx1:M*(6*a*b*x1+3*a^2*x1+2*b^3-3*a^2*b-a^3)/(2*(a+b)^3)`

$\varphi(x_1) = \frac{Mx_1(6abx_1+3a^2x_1+4b^3-6a^2b-2a^3)}{4EI(a+b)^3}$ `phix1:M*x1*(6*a*b*x1+3*a^2*x1+4*b^3-6*a^2*b-2*a^3)/(4*EI*(a+b)^3)`

$w(x_1) = \frac{-Mx_1^2(2abx_1+a^2x_1+2b^3-3a^2b-a^3)}{4EI(a+b)^3}$ `wx1:-M*x1^2*(2*a*b*x1+a^2*x1+2*b^3-3*a^2*b-a^3)/(4*EI*(a+b)^3)`

$V(x_2) = \frac{3Ma(a+2b)}{2(a+b)^3}$ `Vx2:3*M*a*(a+2*b)/(2*(a+b)^3)`
$M(x_2) = \frac{3Ma(2b+a)(x_2-b)}{2(a+b)^3}$ `Mx2:3*M*a*(2*b+a)*(x2-b)/(2*(a+b)^3)`
$\varphi(x_2) = \frac{Ma(6bx_2^2+3ax_2^2-12b^2x_2-6abx_2+4b^3+a^3)}{4EI(a+b)^3}$ `phix2:M*a*(6*b*x2^2+3*a*x2^2-12*b^2*x2-6*a*b*x2+4*b^3+a^3)/(4*EI*(b+a)^3)`
$w(x_2) = \frac{-Ma(x_2-b)(2bx_2^2+ax_2^2-4b^2x_2-2abx_2-2ab^2+a^3)}{4EI(a+b)^3}$ `wx2:-M*a*(x2-b)*(2*b*x2^2+a*x2^2-4*b^2*x2-2*a*b*x2-2*a*b^2+a^3)/(4*EI*(b+a)^3)`
Extremwerte:
$M_{max_{Einsp}} = M_{10} = \frac{M(-a^2-2ab+2b^2)}{2(a+b)^2}$ `MmaxEinsp:M*(-a^2-2*a*b+2*b^2)/(2*(a+b)^2)`
$M_{max_{M,li}} = M(x_1 = a) = \frac{M(2b^3+3a^2b+2a^3)}{2(a+b)^3}$ `MmaxMli:M*(2*b^3+3*a^2*b+2*a^3)/(2*(b+a)^3)`
$M_{max_{M,re}} = M(x_2 = 0) = -\frac{3Mab(a+2b)}{2(a+b)^3}$ `MmaxMre:-3*M*a*b*(a+2*b)/(2*(a+b)^3)`
Wenn a $\geq$ $b(\sqrt{3}-1)$, dann existiert ein w_{max} in Bereich 1
$x_{w,max,1} = \frac{-4b^3+6a^2b+2a^3}{6ab+3a^2}$ `xwMax1:(-4*b^3+6*a^2*b+2*a^3)/(6*a*b+3*a^2)`
$w_{max,1} = -\frac{(2b^2-2ab-a^2)^3 M}{27a^2(2b+a)^2 EI}$ `wMax1:-((2*b^2-2*a*b-a^2)^3*M)/(27*a^2*(2*b+a)^2*EI)`
Wenn b $\geq$ $\frac{a}{2}$, dann existiert ein w_{max} in Bereich 2
$x_{w,max,2} = \frac{-(\sqrt{3}b+\sqrt{3}a)\sqrt{4b^2-a^2}-6b^2-3ab}{6b+3a}$ `xwMax2:-((sqrt(3)*b+sqrt(3)*a)*sqrt(4*b^2-a^2)-6*b^2-3*a*b)/(6*b+3*a)`
$w_{max,2} = -\frac{a(2\cdot b-a)\sqrt{4\cdot b^2-a^2}M}{2\,3^{\frac{3}{2}}(2b+a)EI}$ `wMmax2:-(a*(2*b-a)*sqrt(4*b^2-a^2)*M)/(2*3^(3/2)*(2*b+a)*EI)`