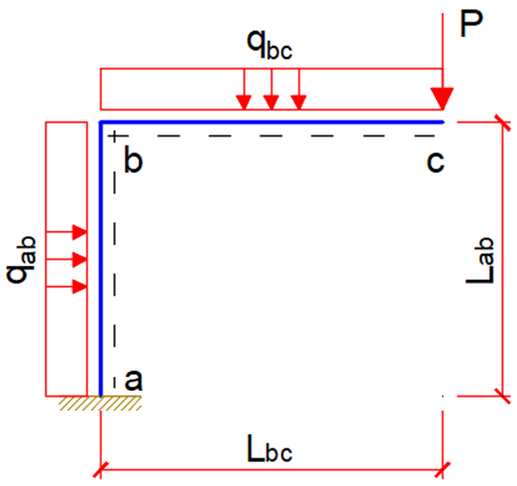
B2T4NB0603A

- Calcular o deslocamento horizontal do ponto "c".



$Lbc := 4,0$ m $qbc := 7,0$ kN/m

$Lab := 6,0$ m $qab := 7,0$ kN/m

$P := 10,0$ kN

- Barra "bc": seção transversal retangular:

$b_bc := 0,20$ m $h_bc := 0,50$ m

- Barra "ab": seção transversal retangular:

$b_ab := 0,30$ m $h_ab := 0,30$ m

- Módulo de elasticidade e coef. de Poisson para todas as barras:

$E := 35 \cdot 10^{6}$ kN/m² $\nu := 0,2$

Q01 - Qual o valor do deslocamento horizontal do ponto "c" devido aos efeitos de esforço cortante [em "mm" e positivo para direita] ?

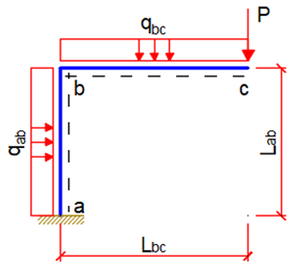
Q02 - Qual o valor do deslocamento horizontal do ponto "c" devido aos efeitos de esforço axial [em "mm" e positivo para direita] ?

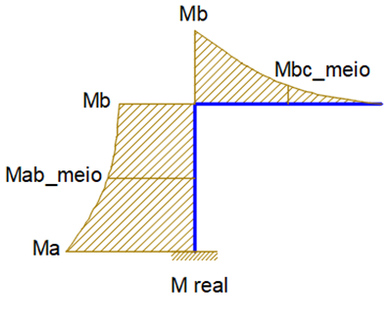
Q03 - Qual o valor do deslocamento horizontal do ponto "c" devido aos efeitos de momento fletor [em "mm" e positivo para direita] ?

Efeitos de Momentos Fletores:

$G := \frac{E}{2 \cdot (1+\nu)} = 1,4583 \cdot 10^{7}$ $A_bc := b_bc \cdot h_bc = 0,1$ $A_ab := b_ab \cdot h_ab = 0,09$

$\chi := \frac{6}{5}$ $I_bc := \frac{b_bc \cdot h_bc^{3}}{12} = 0,0021$ $I_ab := \frac{b_ab \cdot h_ab^{3}}{12} = 0,0007$

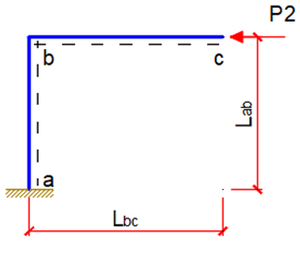


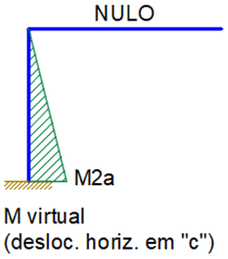


$Mb := -P \cdot Lbc - \frac{qbc \cdot Lbc^{2}}{2} = -96$

$Ma := Mb - qab \cdot \frac{Lab^{2}}{2} = -222$

$Mab_meio := \frac{Ma + Mb}{2} + \frac{qab \cdot Lab^{2}}{8} = -127,5$





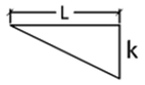
M virtual
(desloc. horiz. em "c")

$P2 := 1$

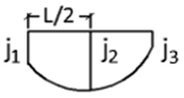
$M2a := P2 \cdot Lab = 6$

Barra "bc": $mbc := 0$

Barra "ab":



$k := M2a = 6$ $j2 := Mab_meio$ $j3 := Ma$ $j1 := Mb$

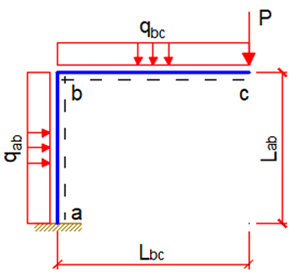


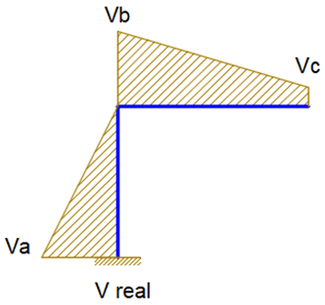
1/6 Lk(2j2+j3)

$$mab := \frac{1}{6} \cdot Lab \cdot k \cdot (2 \cdot j2 + j3) \cdot \frac{1}{E \cdot I_ab} = -0,1211$$

$\delta_hc_mom := -1000 \cdot (mbc + mab) = 121,14$

Efeitos de Esforços Cortantes:

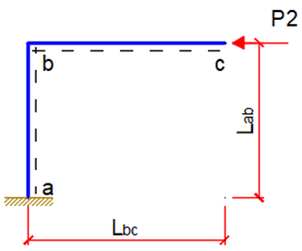


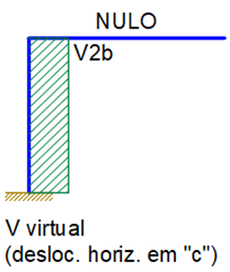


$Vc := P = 10$

$Vb := P + qbc \cdot Lbc = 38$

$Va := qab \cdot Lab = 42$

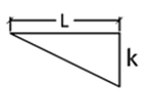




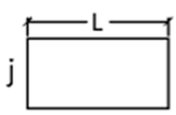
$V2b := -P2 = -1$

Barra "bc": $vbc := 0$

Barra "ab":



$k := Va = 42$ $j := V2b = -1$

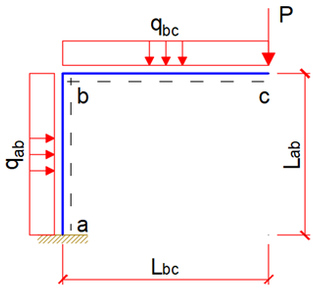


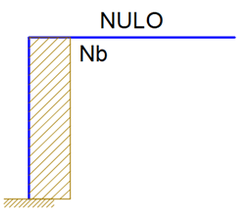
1/2 Ljk

$$vab := \chi \cdot \frac{1}{2} \cdot Lab \cdot j \cdot k \cdot \frac{1}{G \cdot A_ab} = -0,0001152$$

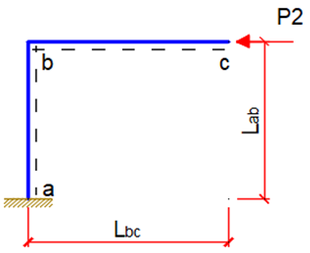
$\delta_hc_cor := -1000 \cdot (vbc + vab) = 0,1152$

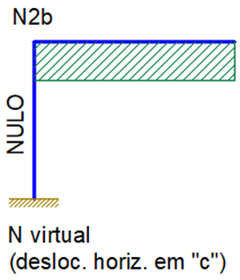
Efeitos de Esforços Axiais:





$Nb := -P - qbc \cdot Lbc = -38$





N virtual
(desloc. horiz. em "c")

$N2b := -P2 = -1$

Barra "ab": $nab := 0$

Barra "bc": $nbc := 0$

$\delta_hc_axi := -1000 \cdot (nab + nbc) = 0$

$Q01 := \delta_hc_cor = 0,11520$
$Q02 := \delta_hc_axi = 0,0000$
$Q03 := \delta_hc_mom = 121,14$
