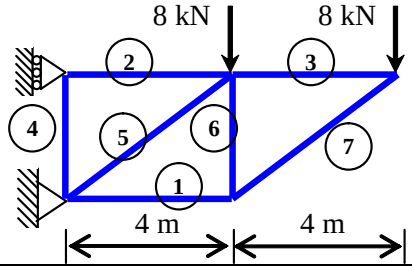
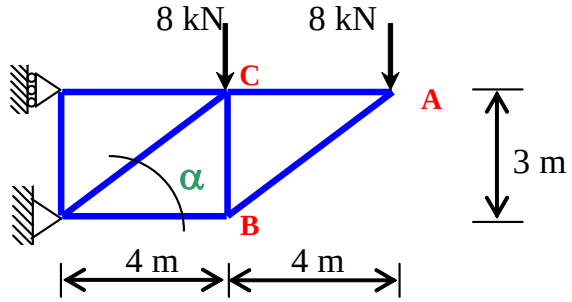
Exercício

Calcule o deslocamento vertical do nó **A**, indicado na treliça isostática vista na figura ao lado. Considere que todas as barras têm inércia constante. E=210 GPa e seção tubular de 150 mm de diâmetro externo e 5 mm de espessura.

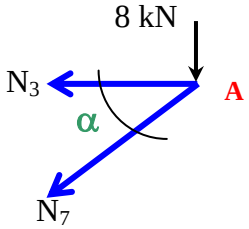


$$\text{sen}\,\alpha = \frac{3}{5} = 0{,}6$$

$$\cos\alpha = \frac{4}{5} = 0{,}8$$



Estado de deformação

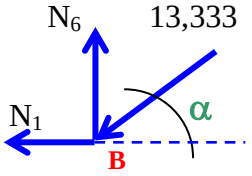


$8 + N_7 \text{sen}\,\alpha = 0$

$\therefore \boxed{N_7 = -13{,}333\ \text{kN}}$

$N_3 + N_7 \cos\alpha = 0$

$\therefore \boxed{N_3 = +10{,}667\ \text{kN}}$

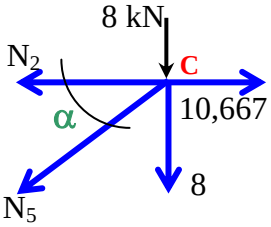


$N_1 + 13{,}333\cos\alpha = 0$

$\therefore \boxed{N_1 = -10{,}667\ \text{kN}}$

$N_6 - 13{,}333\,\text{sen}\,\alpha = 0$

$\therefore \boxed{N_6 = +8\ \text{kN}}$

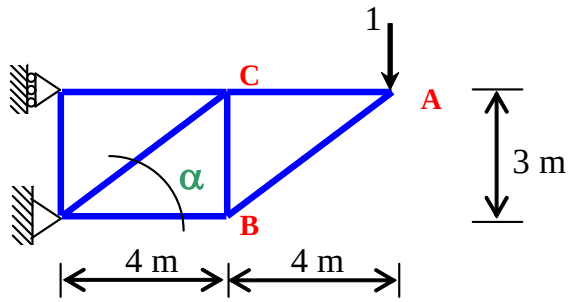


$N_5 \text{sen}\,\alpha + 8 + 8 = 0$

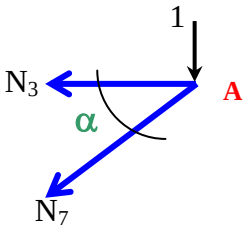
$\therefore \boxed{N_5 = -26{,}667\ \text{kN}}$

$N_2 + N_5 \cos\alpha - 10{,}667 = 0$

$\therefore \boxed{N_2 = +32\ \text{kN}}$



Estado de Carregamento

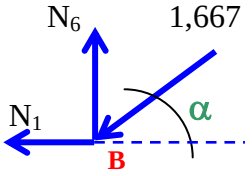


$1 + N_7 \text{sen}\,\alpha = 0$

$\therefore \boxed{N_7 = -1{,}667}$

$N_3 + N_7 \cos\alpha = 0$

$\therefore \boxed{N_3 = +1{,}333}$

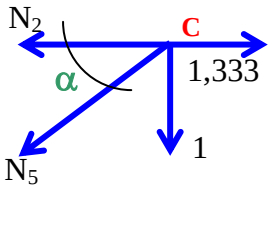


$N_1 + 1{,}667\cos\alpha = 0$

$\therefore \boxed{N_1 = -1{,}333}$

$N_6 - 1{,}667\,\text{sen}\,\alpha = 0$

$\therefore \boxed{N_6 = +1}$



$N_5 \text{sen}\,\alpha + 1 = 0$

$\therefore \boxed{N_5 = -1{,}667}$

$N_2 + N_5 \cos\alpha - 1{,}333 = 0$

$\therefore \boxed{N_2 = +2{,}667}$

Barra	N	$\overline{N}$	L	$N.\overline{N}.L$
1	-10,6667	-1,3333	4,0	
2	32,0000	2,6667	4,0	
3	10,6667	1,3333	4,0	
4	0,0000	0,0000	3,0	
5	-26,6667	-1,6667	5,0	
6	8,0000	1,0000	3,0	
7	-13,3333	-1,6667	5,0	
			$\sum N.\overline{N}.L =$	
		$\delta =$	$\sum \frac{N.N.L}{E.A} =$	

$\therefore \delta =$ mm

Resposta: **O deslocamento vertical do nó A é de mm.**