

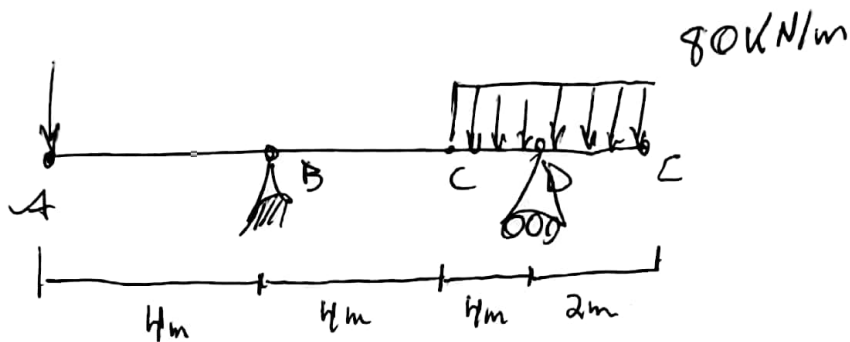
Avaliação LAB - parte 2

Data: 03/09/2021

Aluno: Davi Ferreira S. de Lima

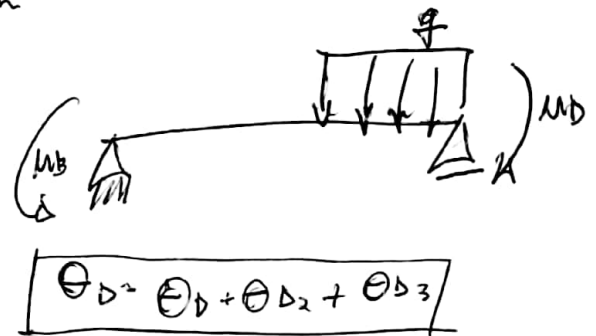
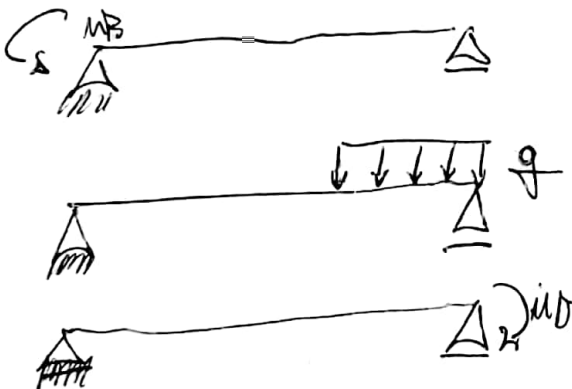
Matrícula: 17110994

1. Questões



~~Fracionando em três intervalos:~~

3 casos



Cálculo:

$$\begin{cases} q = 80 \text{ kN/m} \\ M_B \approx 35,40 \text{ kN.m} \\ M_D = 80,26 \text{ kN.m} \end{cases}$$

$$\theta_{D1} \approx 0,0026 \text{ rad}$$

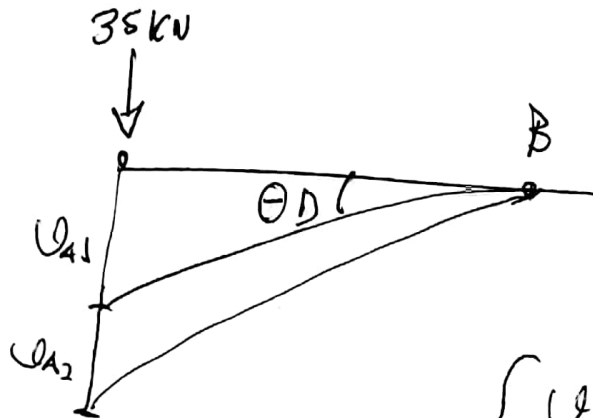
$$\theta_{D2} = -0,01367 \text{ rad}$$

$$\theta_{D3} = 0,00007 \text{ rad}$$

→ Pelo método da sobreposição:

$$\boxed{\theta_D = -0,005 \text{ rad}}$$

• Deslocamento em A:



$$\begin{cases} U_{A1} = \theta_D \cdot H \\ U_{A2}: \text{Deslocamento devido à} \\ \text{Carga pontual de } -35 \text{ kN ver.} \\ \text{tical.} \end{cases}$$

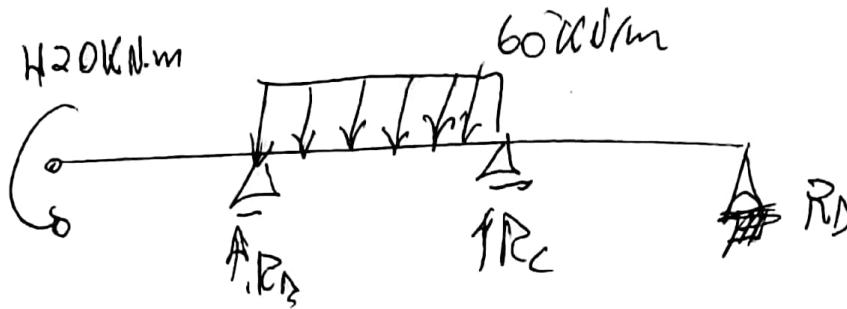
Portanto,

$$U_{A1} \approx 0,0091 \text{ m}; \quad U_{A2} = \frac{35 \cdot H^3}{3E \cdot I_2} \approx -0,01063$$

Assim,

$$\boxed{U_A = 0,0091 - 0,01063 \approx -1,5 \text{ mm}}$$

2 Questão.



Seja R_D redundante:

$$\begin{aligned} \sum M_A = 0 &\Rightarrow 420 + R_B \cdot 3 - 360 \cdot 6 + R_C \cdot 9 + R_D \cdot 15 = 0 \\ &\Rightarrow R_B \cdot 3 + R_C \cdot 9 = -R_D \cdot 15 - 420 + 360 \cdot 6 \end{aligned}$$

$$\sum F_y = 0 \Rightarrow R_B + R_C + R_D - 360 = 0 \Rightarrow R_B + R_C = 360 - R_D$$

$$\delta = 0 \quad ; \quad \delta = \theta_C \cdot 6 + \frac{R_D \cdot 6^3}{3EI}$$

$$\theta_C = \theta_{C1} + \theta_{C2}$$

$$\left\{ \begin{aligned} \theta_{C1} &= \frac{60 \cdot 6^3}{24 \cdot 2EI} = \frac{270}{EI} \\ \theta_{C2} &= \frac{-420 \cdot 6}{12EI} = \frac{-240}{EI} \end{aligned} \right.$$

$$\Rightarrow \theta_C = \frac{60}{EI}$$

$$\delta = \frac{360}{EI} + \frac{R_D \cdot 6^3}{3EI} = 0 \Rightarrow R_D = -5 \text{ kN}$$

$$R_B + R_C = 365$$

$$3R_B + 9R_C = -420 + 2160 + 75 = 1815$$

$$\begin{aligned} R_B &= 245 \text{ kN} \\ R_C &= 120 \text{ kN} \end{aligned}$$