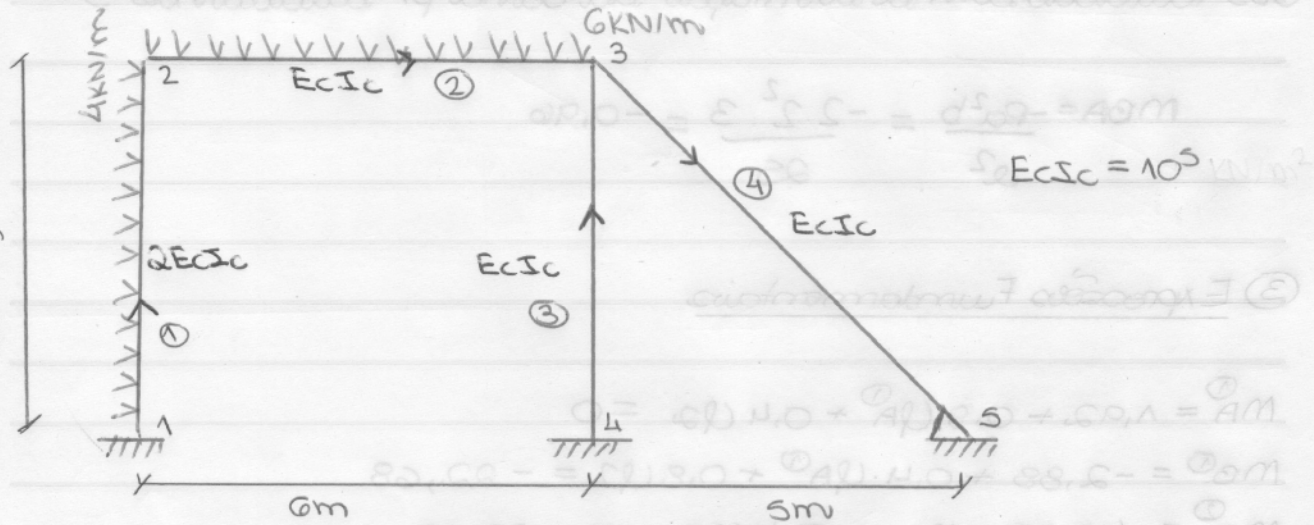


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$4 \times 1.1 = 4.4 \text{ m}$ $5 \times 1.1 = 5.5 \text{ m}$ $2 \times 1.1 = 2.2 \text{ m}$ $2 \times 1.1 = 2.2 \text{ m}$

Porticos Indeslocáveis



Análise a treliça equivalente → isostática → indeslocável

①	GDL	Ea. Ea.
U2		$M_B^{①} + M_A^{②} = 0$
U3		$M_B^{②} + M_B^{③} + M_A^{④} = 0$
U5		$M_B^{⑤} = 0$

② Caracterização

Barras 1: $L=5$ $L'=2.5$ $\beta=1.0$ $M_{AB}=8.33$ $M_{BA}=-8.33$

Barras 2: $L=6$ $L'=6$ $\beta=0.667$ $M_{AB}=18$ $M_{BA}=-18$

Barras 3: $L=5$ $L'=5$ $\beta=0.8$ $M_{AB}=0$ $M_{BA}=0$

Barras 4: $L=5\sqrt{2}$ $L'=5\sqrt{2}$ $\beta=0.566$ $M_{AB}=0$ $M_{BA}=0$

$$\begin{bmatrix} E_1 E_1 = 10^5 \\ H_1 E_1 = 10^5 \\ G_1 E_1 = 10^5 \end{bmatrix} \begin{bmatrix} C_{P,1} \\ P_{E,1} \\ E_{2,1} \end{bmatrix} = \begin{bmatrix} 10^5 \\ 10^5 \\ 10^5 \end{bmatrix} \begin{bmatrix} 0 & 4.0 & 8.0 \\ 2.0 & 8.0 & 4.0 \\ 2.0 & 2.0 & 0 \end{bmatrix}$$

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③ Expressions Fondamentales

$$MA^{①} = 8,33 + 0,842 = 3,68$$

$$MB^{①} = -8,33 + 1,642 = -17,63$$

$$MA^{②} = 18 + 0,66742 + 0,33343 = 17,60$$

$$MB^{②} = -18 + 0,33342 + 0,66743 = -12,90$$

$$MA^{③} = 0,443 = 4,22$$

$$MB^{③} = 0,843 = 8,143$$

$$MA^{④} = 0,56643 + 0,28345 = 4,147$$

$$MB^{④} = 0,28343 + 0,56645 = 0$$

④ Eq. de Eq. globales :

$$Q_2: 9,67 + 2,267Q_2 + 0,333Q_3 = 0$$

$$Q_3: -18 + 0,333Q_2 + 2,033Q_3 + 0,283Q_5 = 0$$

$$Q_5: 0,283Q_3 + 0,566Q_5 = 0$$

$$\begin{pmatrix} 2,267 & 0,333 & 0 \\ 0,333 & 2,033 & 0,283 \\ 0 & 0,283 & 0,566 \end{pmatrix} \begin{pmatrix} Q_2 \\ Q_3 \\ Q_5 \end{pmatrix} = \begin{pmatrix} -9,67 \\ 18 \\ 0 \end{pmatrix}$$

$$Q_2 = -5,81$$

$$Q_3 = 10,54$$

$$Q_5 = -5,27$$