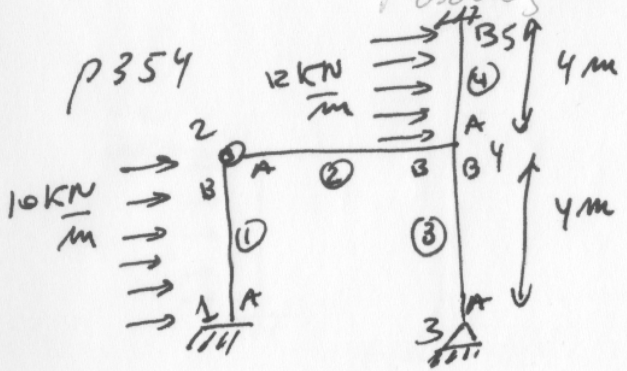
Resolução de pórticos

prova 2 : 21/5

prova 3 16/6

p354

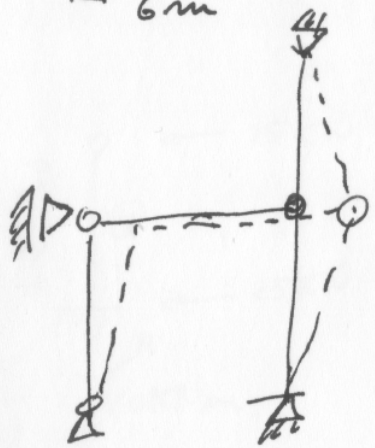


Consideram-se que as barras são inextensíveis

Grau de liberdades

Deslocamento generalisado u_2

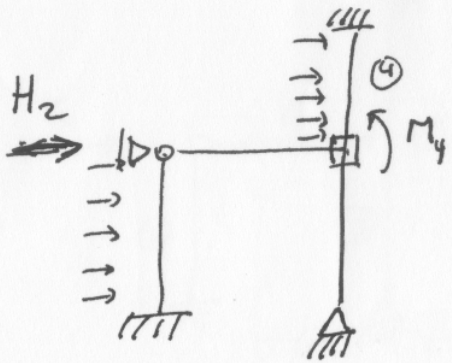
Giro do nó 4 φ_4



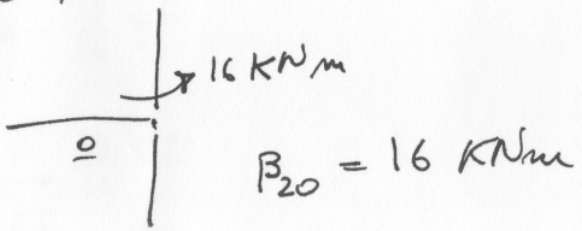
Força generalisada H_2

caracterizada pelo movimento da treliça equivalente

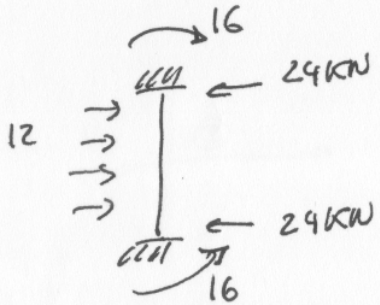
Cálculo do caso (0)

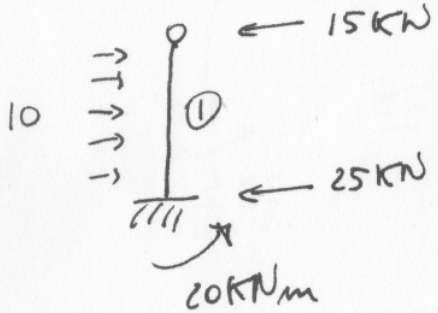


nó 4

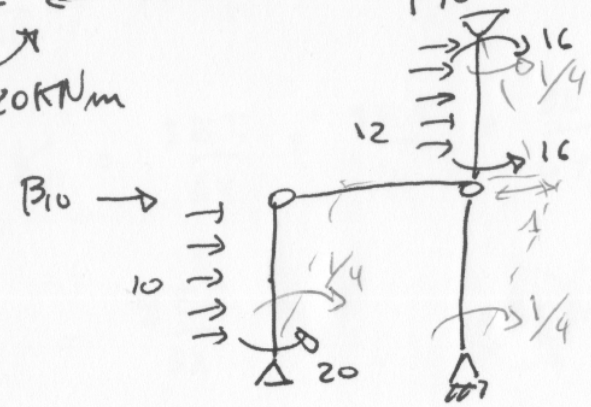


$\beta_{20} = 16$ KNm





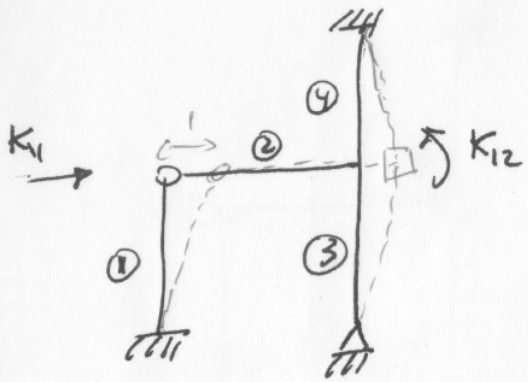
$\beta_{10} = -15-24 = -39$ KN

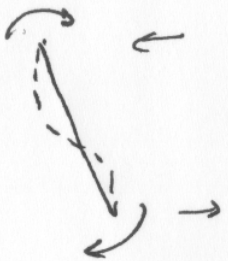


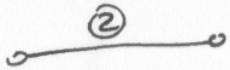
PTV: $\beta_{10} - \frac{20}{4} + \frac{40}{2} + 24 = 0$

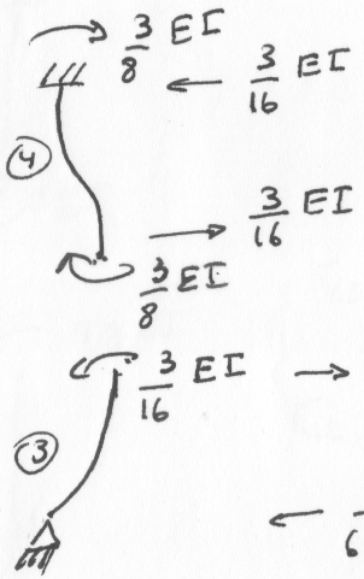
$\beta_{10} = -24 - 15 = -39$ KN

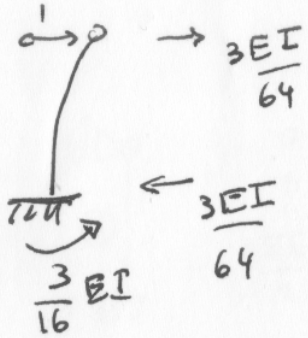
Caso (1)











$$K_{11} = \frac{3EI}{64} + \frac{3EI}{16} + \frac{3EI}{64}$$

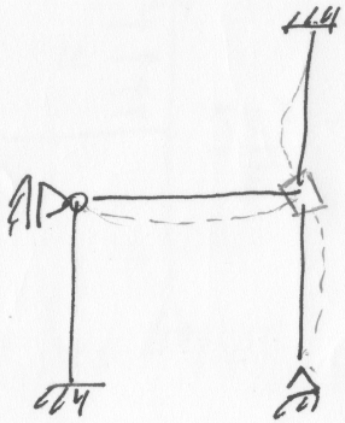
$$= \frac{9EI}{32}$$

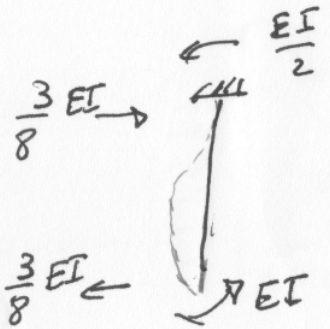
Todas as barras tem a mesma seção!

$$K_{12} = \frac{3}{16}EI - \frac{3}{8}EI = -\frac{3}{16}EI$$

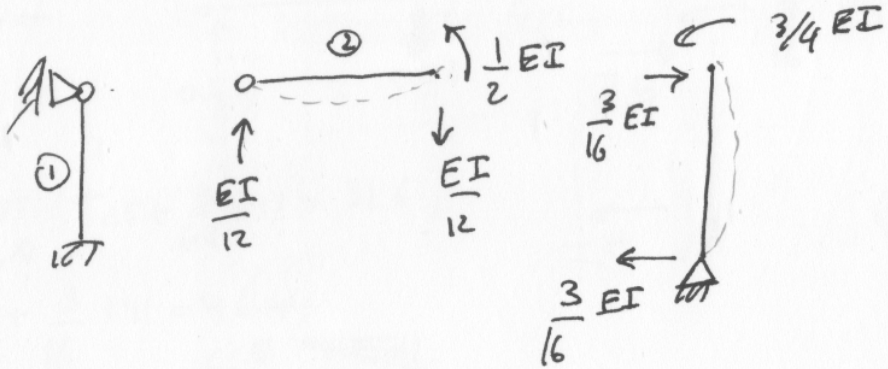
K_{21}

Caso 2





$$K_{22} = EI + \frac{3}{4}EI + \frac{EI}{2} = \frac{9}{4}EI$$



$$K_{12} = \frac{3}{16}EI - \frac{3}{8}EI = \frac{-3}{16}EI$$

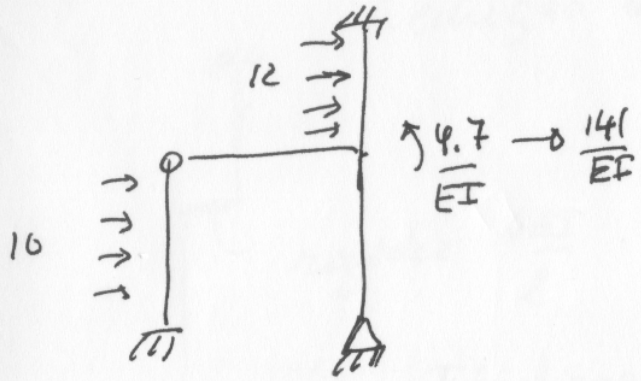
Sistema de equações

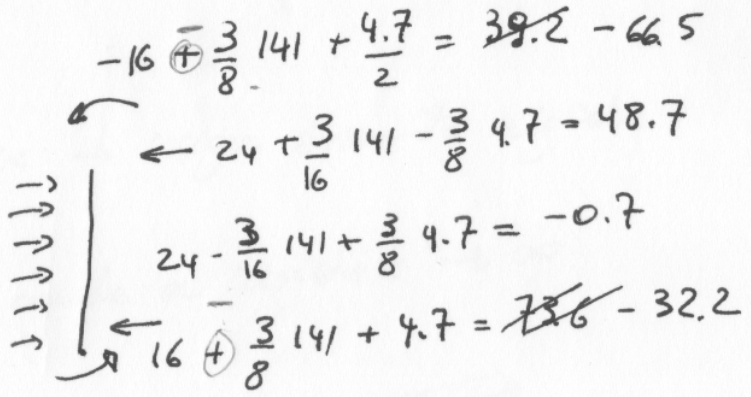
$$u_2 = \frac{1}{EI}\,141 = \frac{7232}{51}\,\frac{1}{EI}$$

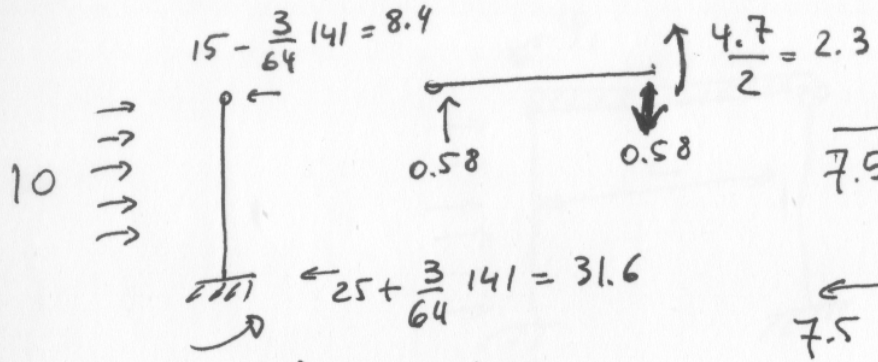
$$\varphi_4 = \frac{1}{EI}\,4.7 = \frac{80}{17}\,\frac{1}{EI}$$

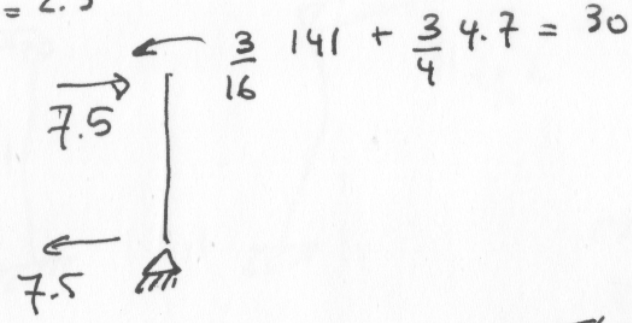
$$EI\begin{bmatrix} \frac{9}{32} & -\frac{3}{16} \\ -\frac{3}{16} & \frac{9}{4} \end{bmatrix}\begin{bmatrix} u_2 \\ \varphi_4 \end{bmatrix} + \begin{bmatrix} -39 \\ 16 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

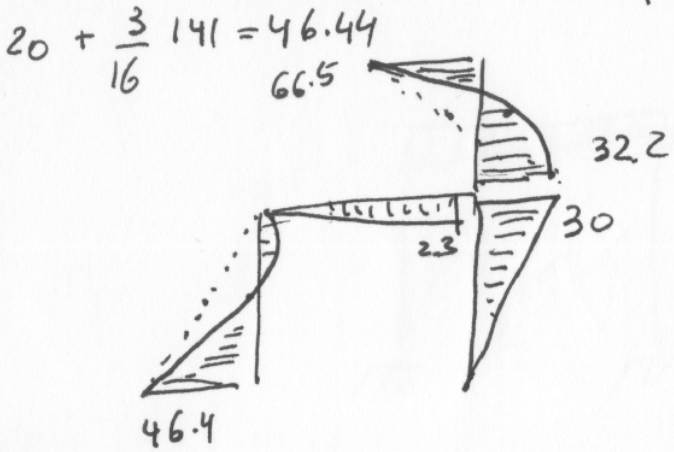
Calculo dos momentos

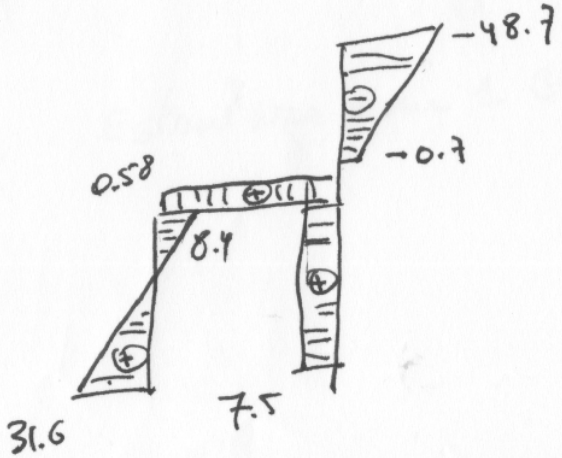








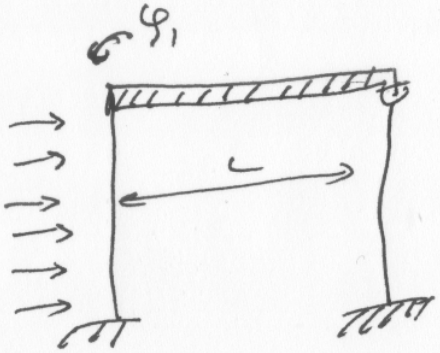


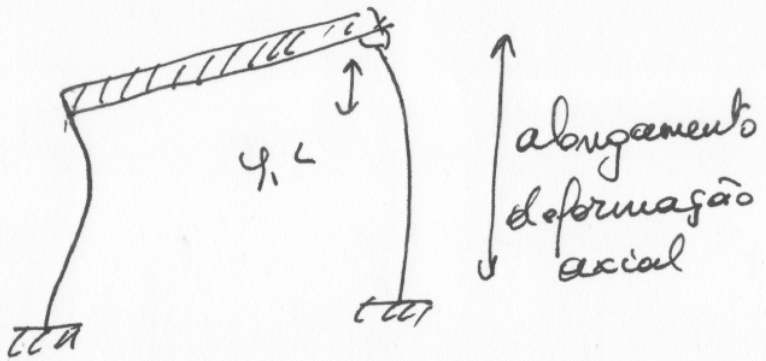


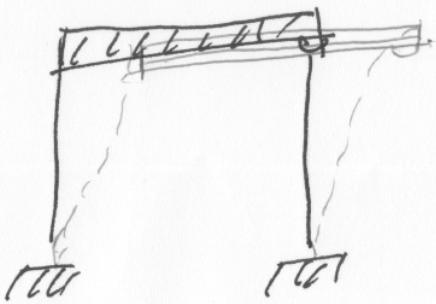
Redução de mobilidade

rigidez $\frac{4EI}{l}$ caso $l \ll$ → viga é muito rijeida

Idealizar o caso onde a rigidez → ∞







Estrutura com 1 G-DL