

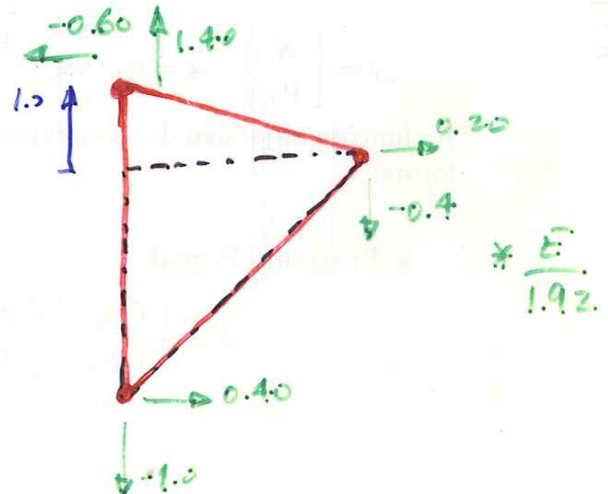
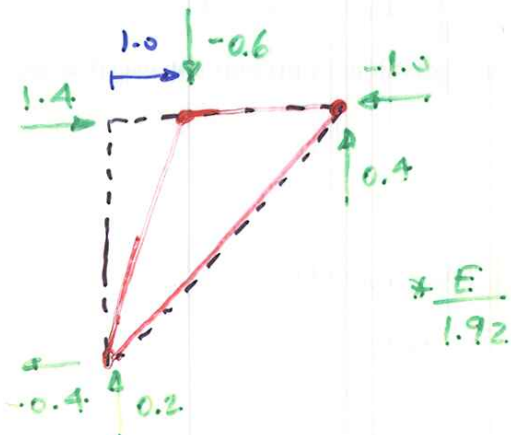
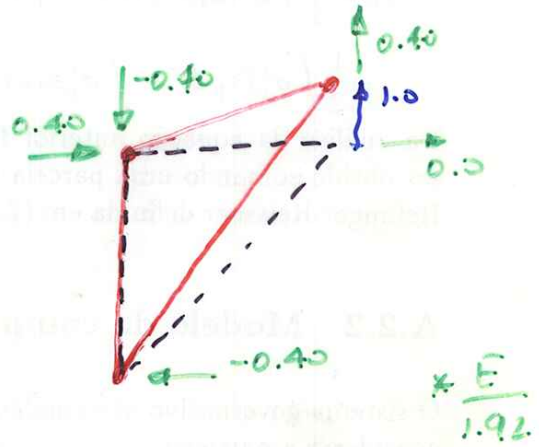
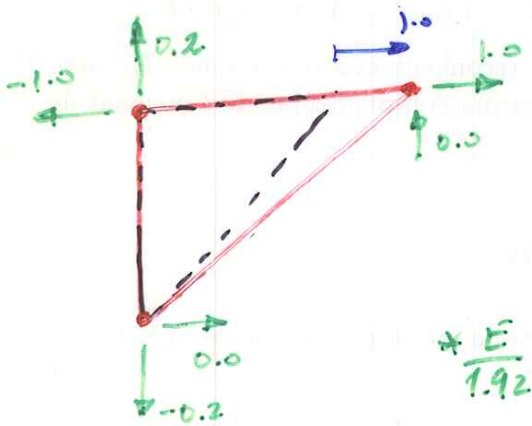
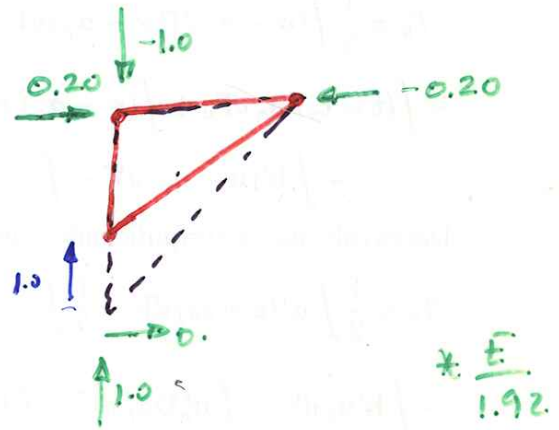
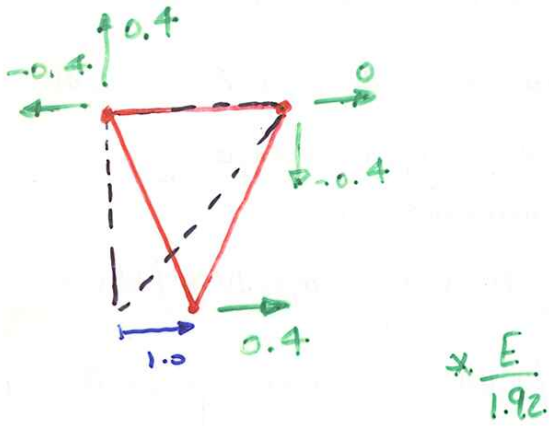
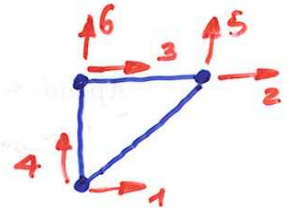
MATRIZ DE RIGIDEZ ELEMENTAR

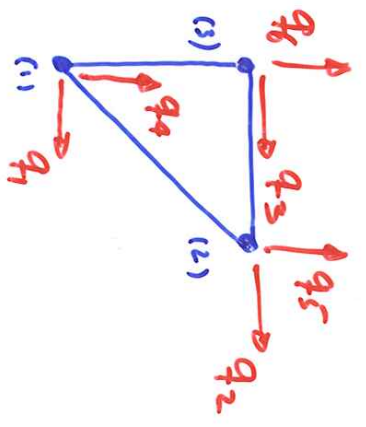
(UTILIZANDO A INFORMAÇÃO TABELADA)

$$\underline{K}^{(el)} = \begin{bmatrix} 0.4 & 0.0 & -0.4 & 0 & -0.4 & 0.4 \\ 0.0 & 1.0 & -1.0 & -0.2 & 0 & 0.2 \\ -0.4 & -1.0 & 1.4 & 0.2 & 0.4 & -0.6 \\ 0.0 & -0.2 & 0.2 & 1.0 & 0.0 & -1.0 \\ -0.4 & 0.0 & 0.4 & 0.0 & 0.4 & -0.4 \\ 0.4 & 0.2 & -0.6 & -1.0 & -0.4 & 1.4 \end{bmatrix} \times \frac{E}{1.92}$$

MATRIZ DE RIGIDEZ ELEMENTAR

(SIGNIFICADO FÍSICO)





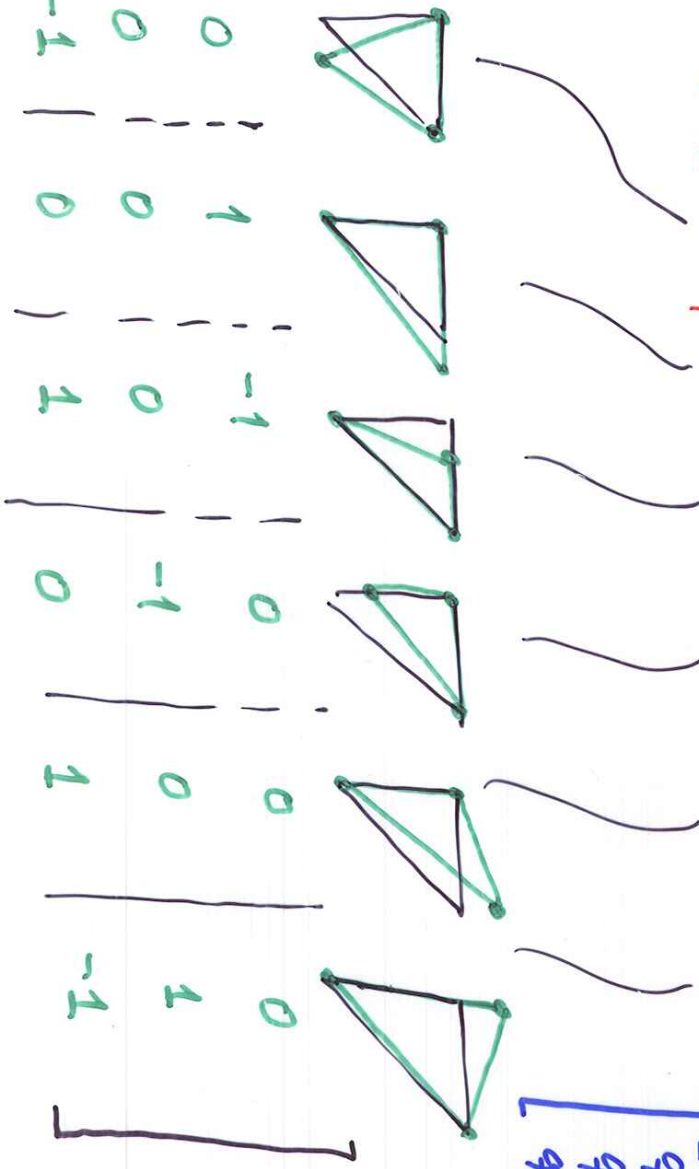
$$\psi_1(u,y) = 1-y$$

$$\psi_2(u,y) = x$$

$$\psi_3(u,y) = y-x$$

ELEMENTO TRIANGULAR
(DE DEFINIÇÕES CONSTANTES)

$$\begin{bmatrix} u_x(u,y) \\ u_y(u,y) \end{bmatrix} = \begin{bmatrix} 1-y & x & y-x & 0 & 0 & 0 \\ 0 & 0 & 0 & 1-y & x & y-x \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \\ q_5 \\ q_6 \end{bmatrix}$$



$$B = \begin{bmatrix} 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ -1 & 0 & 1 & 0 & 1 & -1 \end{bmatrix}$$

$$q_1 = 1.0; q_k = 0. \quad (k \neq 1)$$



$$\begin{cases} \mu_x = 1-y \\ \mu_y = 0 \end{cases}$$

$$\begin{cases} \epsilon_x = 0 \\ \epsilon_y = 0 \\ \gamma_{xy} = -1 \end{cases} \quad \begin{cases} \sigma_x = 0 \\ \sigma_y = 0 \\ \sigma_{xy} = \frac{E}{2(1+\nu)} (-1) \end{cases}$$

$$\begin{cases} f_x = -\frac{\partial \sigma_x}{\partial x} - \frac{\partial \sigma_{xy}}{\partial y} = 0 \\ f_y = -\frac{\partial \sigma_{xy}}{\partial x} - \frac{\partial \sigma_y}{\partial y} = 0 \end{cases}$$

$$\begin{cases} t_x = \sigma_{xx} \mu_x + \sigma_{xy} \mu_y = -\frac{E}{2(1+\nu)} \mu_y \\ t_y = \sigma_{xy} \mu_x + \sigma_{yy} \mu_y = -\frac{E}{2(1+\nu)} \mu_x \end{cases}$$

