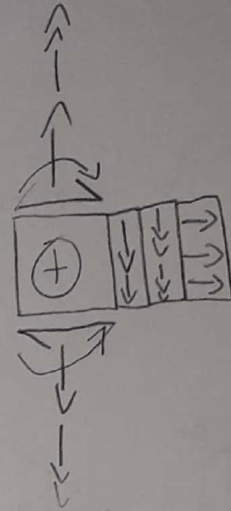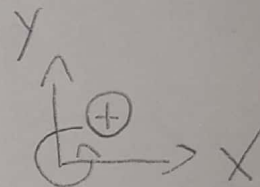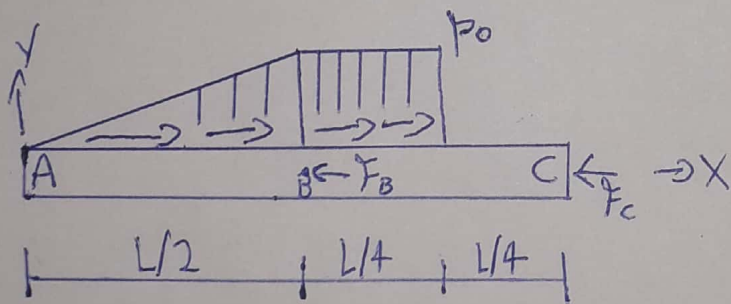Lista de exercícios Ca - Cc - Ebing
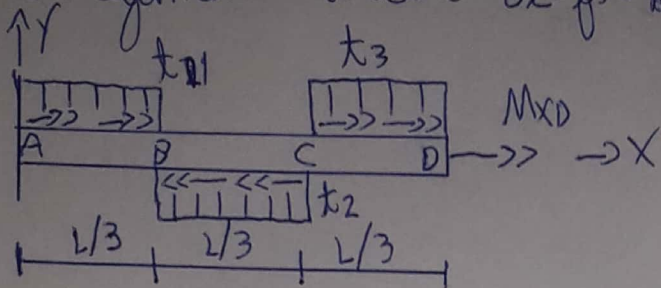
Carregamento Axial

Ex - fs - axial - 04
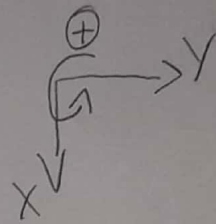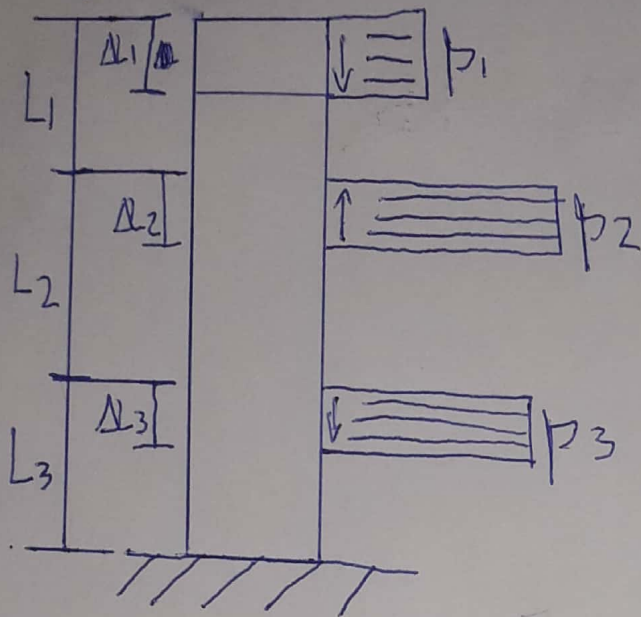
$$p(x) = p_1 \langle x-0 \rangle^0 - p_1 \langle x-\Delta L_1 \rangle^0 - p_2 \langle x-L_1 \rangle^0 + p_2 \langle x-\Delta L_2 \rangle^0 + p_3 \langle x-L_2 \rangle^0 - p_3 \langle x-\Delta L_3 \rangle^0$$
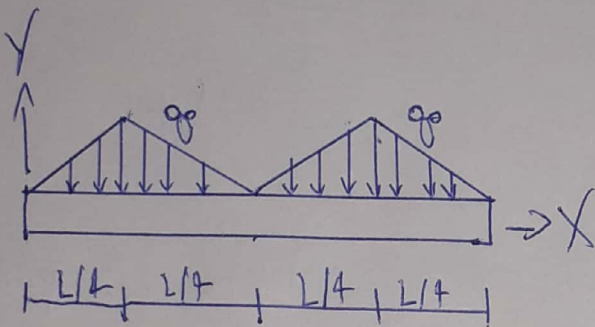
Ex - fs - axial - 05 - b

$$p(x) = \frac{2p_0}{L} \langle x-0 \rangle^1 - \frac{2p_0}{L} \langle x-L/2 \rangle^1 - p_0 \langle x-3L/4 \rangle^1 - F_B \langle x-L/2 \rangle^{-1} - F_c \langle x-L \rangle^{-1}$$

Carregamento Parcial Ex-fo-Tração-01

$$t(x) = t_1 \left[\langle x-0 \rangle^0 - \langle x-L/3 \rangle^0 \right] - t_2 \left[\langle x-L/3 \rangle^0 + \langle x-2L/3 \rangle^0 \right] + t_3 \langle x-2L/3 \rangle^0 \langle x-L \rangle^0$$

Carregamento Transversal Ex-fo-10

$$q(x) = -\frac{4 q_0}{L} \langle x-0 \rangle^1 + \frac{4 q_0}{L} \langle x-L/4 \rangle^1 - \frac{4 q_0}{L} \langle x-L/2 \rangle^1 + \frac{4 q_0}{L} \langle x-3L/4 \rangle^1$$

E-Viga 22

$q_0 = 20 \, KN/m$

$\overset{P}{D} = 80 \, KN$

2m   4m   2m   4m

$$p(x) = -p_0 \langle x-2 \rangle^0 + q_0 \langle x-6 \rangle^0 - t_B \langle x-1 \rangle^{-1}$$

Parte 2
Carregamento Axial
Ex-fo-axial 03

$$p(x) = \frac{2p_0}{L}\langle x-0\rangle^1 - F_B\langle x-L/2\rangle^1 - \frac{2p_0}{L}\langle x-L/2\rangle^1$$

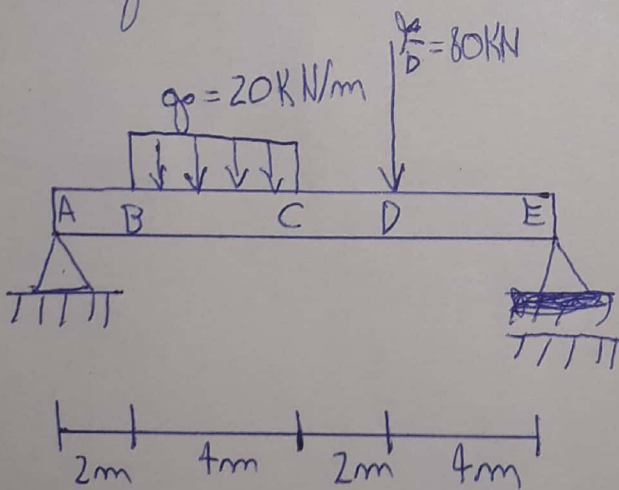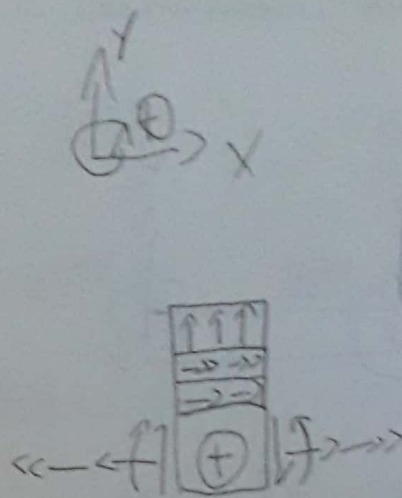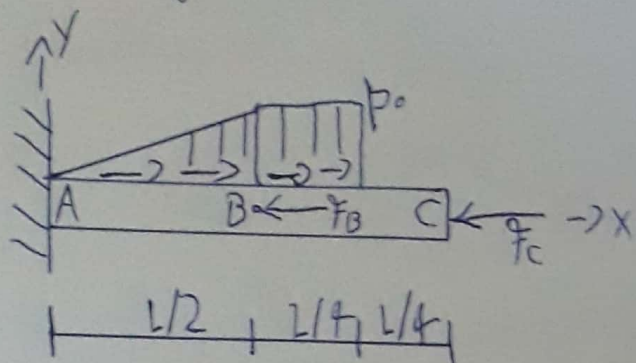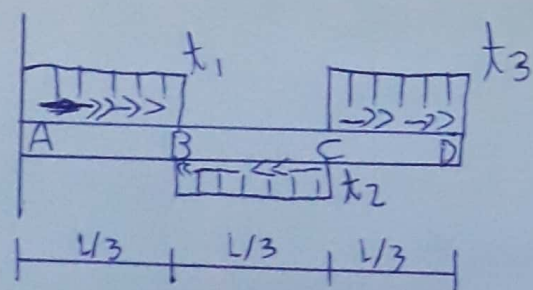$$\frac{dN_x}{dx} = -p(x) \qquad N_x(L) = -F_c$$

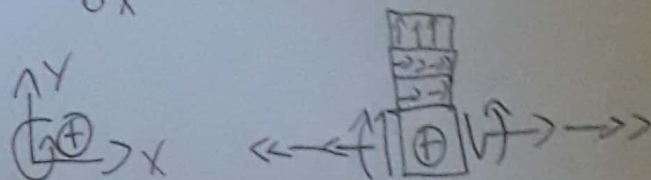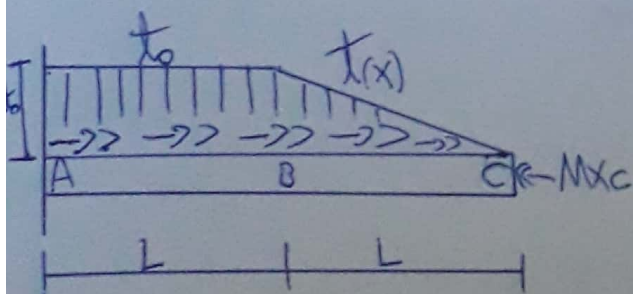### Ex-Torção-01

$$t(x) = t_1\langle x-0\rangle^0 - t_1\langle x-L/3\rangle^0 - t_2\langle x-L/3\rangle^0$$
$$+ t_2\langle x-2L/3\rangle^0 + t_3\langle x-2L/3\rangle^0$$

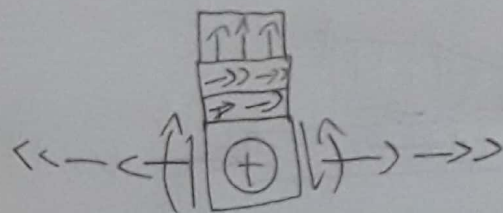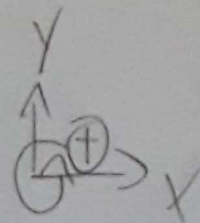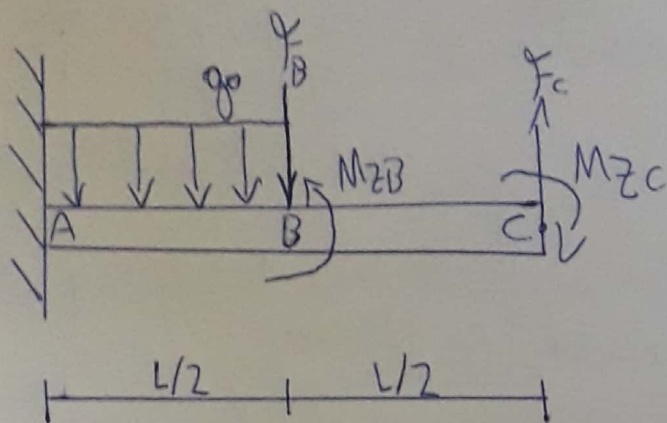$$\frac{dM_x(x)}{dx} = -t(x) \qquad M_x(L) = M_{x_D}$$

E-Torção-05

$$t(x) = t_0\langle x-0\rangle^0 - \frac{t_0}{L}\langle x-L\rangle^0$$

$$\frac{dM_x}{dx} = -t(x) \qquad M(2L) = -M_{x_C}$$

Carregamento Transversal

$$q^{(x)} = -q_0 \langle X-0 \rangle^0 + q_0 \langle X-L/2 \rangle^0 - F_B \langle X-L/2 \rangle^{-1} - M_{zc} \langle X-L/2 \rangle^{-2}$$

$$\frac{dV_z}{dX} = q^{(x)}$$

$$V_z(L) = F_c \qquad M_z(L) = -M_{zc}$$

$$\frac{d^2 M_z}{dx^2} = q^{(x)}$$

q