

DCL global + Equilibre

F: force fichtre

$$\sum F_y = 0: R_D - P - R_C = 0$$

$$\boxed{R_D = P + R_C} \quad (1)$$

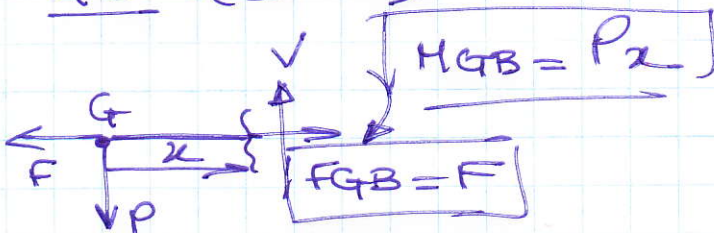
$$\sum M_{D(0)}^{\uparrow}: PL - FL - R_C L = 0$$

$$\boxed{R_C = P - F} \quad (2)$$

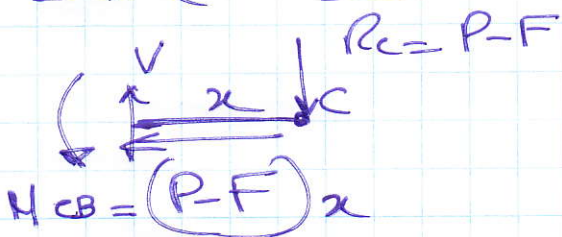
• (2) dans (1):  $\boxed{R_D = 2P - F}$

• Efforts internes:

GB ( $0 < x \leq L$ )



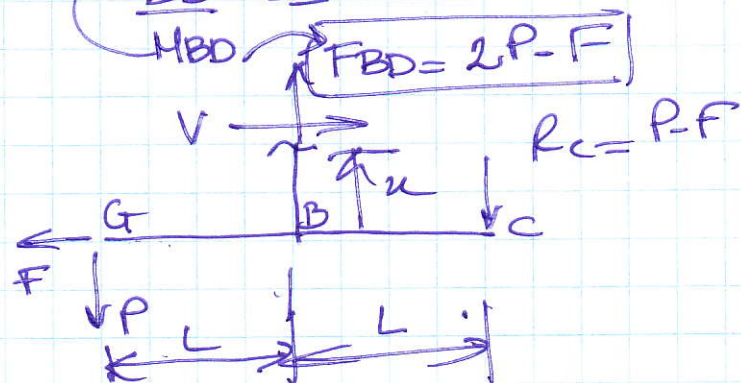
CB ( $0 < x \leq L$ )



$$M_{BD} = PL - Fx - (P-F)L$$

$$= \boxed{-Fx + FL = F(L-x)}$$

DB ( $0 < x \leq L$ )



$$u_q = \frac{\partial W}{\partial F} \Big|_{F=0} = \sum \int_0^L \frac{M_i \partial M_i / \partial F}{E_i I_i} dx + \frac{\sum F_i \partial F_i / \partial F \cdot L_i}{A_i E_i}$$

$$\frac{\partial M_{GB}}{\partial F} = 0$$

$$\frac{\partial M_{CB}}{\partial F} = -x$$

$$\frac{\partial M_{BD}}{\partial F} = L - x$$

$$\frac{\partial F_{GB}}{\partial F} = 1$$

$$\frac{\partial F_{BD}}{\partial F} = -1$$

$$u_q = \int_0^L \frac{M_{GB} \frac{\partial M_{GB}}{\partial F}}{EI} dx + \int_0^L \frac{M_{CB} \frac{\partial M_{CB}}{\partial F}}{EI} dx + \int_0^L \frac{M_{BD} \frac{\partial M_{BD}}{\partial F}}{EI} dx + \frac{F_{GB} \partial F_{GB} / \partial F \cdot L}{AE} + \frac{F_{BD} \partial F_{BD} / \partial F \cdot L}{AE}$$



$$U_G = \int_0^L \frac{(P-F)x \cdot (-x) dx}{EI} + \int_0^L \frac{F(L-x)(Lx)}{EI} dx$$

$$+ \frac{FL}{AE} + \frac{(2P-F)(-L)L}{AE}$$

$$- \frac{(P-F)x^3}{3EI} \Big|_0^L - \frac{F(L-x)^2}{2EI} \Big|_0^L$$

$$- \frac{2PL}{AE} = \left[ - \frac{PL^3}{3EI} - \frac{2PL}{AE} \right]$$