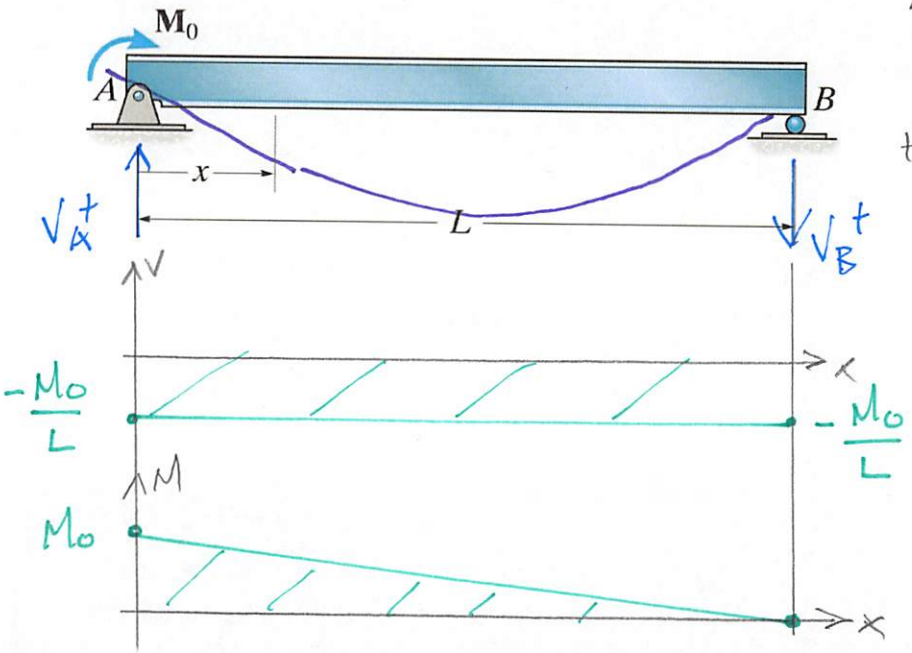
Example 7b-4: Use the conjugate beam method to determine the slope at point *B* and the displacement at $x = L/2$. Assume that *EI* is constant.



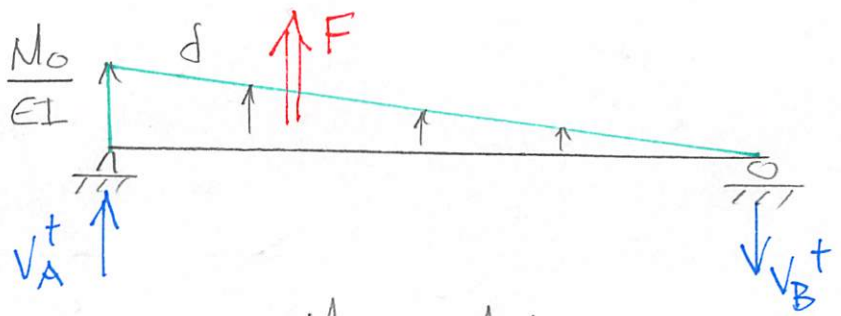
$$\circlearrowleft + \sum M_B = 0 = -M_0 - V_A(L) \qquad V_A = -\frac{M_0}{L}$$

$$+\uparrow \sum F_y = 0 = V_A - V_B \qquad V_B = -\frac{M_0}{L}$$

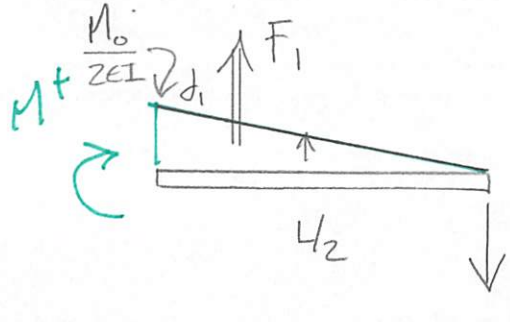
$$\circlearrowleft + \sum M_A = 0 = F\left(\frac{L}{3}\right) - V_B L \qquad V_B = \frac{F}{3}$$

$$V_B = \frac{M_0 L}{6EI}$$

CONJUGATE BEAMS



$$F = \frac{1}{2}(L)\frac{M_0}{EI} = \frac{M_0 L}{2EI}$$



$$F_1 = \frac{1}{2}\left(\frac{L}{2}\right)\left(\frac{M_0}{2EI}\right) = \frac{M_0 L}{8EI}$$

$$d_1 = \frac{1}{3}(L/2) = L/6$$

$$\circlearrowleft + \sum M_{CUT} = 0 = -M + F_1 d_1 - \frac{M_0 L}{6EI}(L/2)$$

$$M = \frac{M_0 L^2}{48EI} - \frac{M_0 L^2}{12EI} = -\frac{3M_0 L^2}{48EI}$$