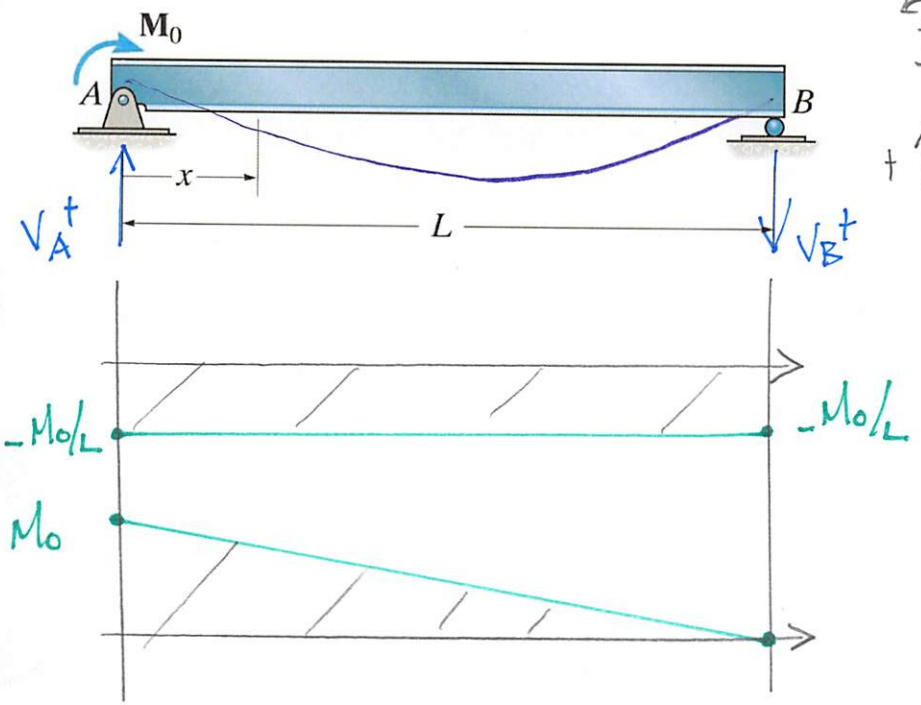
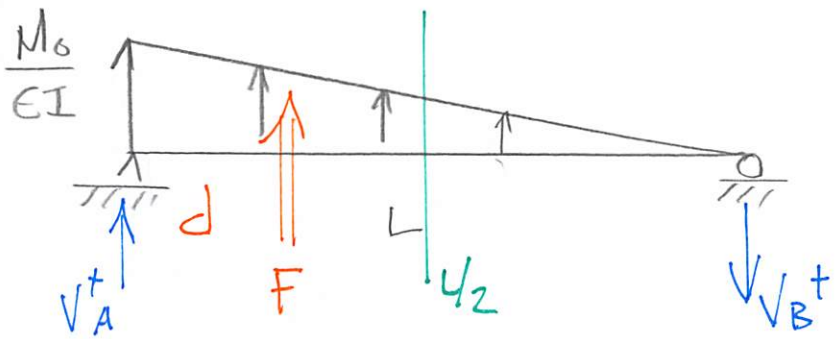
Example 7b-4: Use the conjugate beam method to determine the slope at point *B* and the displacement at $x = L/2$. Assume that *EI* is constant.



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

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

CONJUGATE BEAM

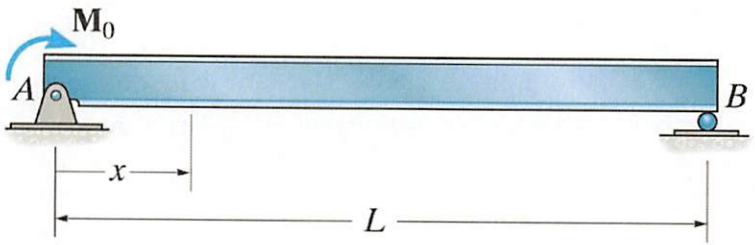


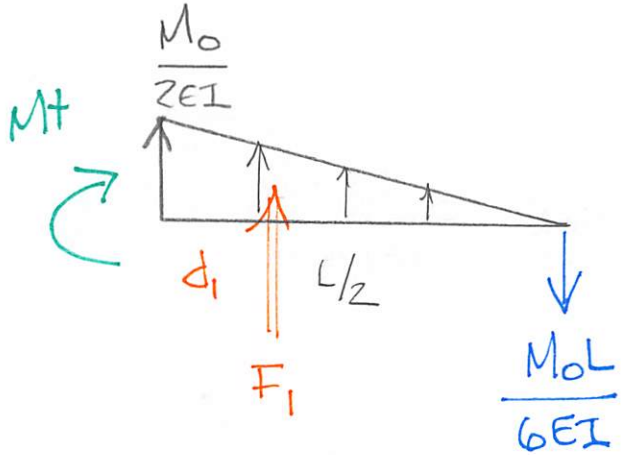
$$\circlearrowleft + \sum M_A = 0 = Fd - V_B(L) \qquad V_B = \frac{Fd}{L}$$

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

$$F = \frac{1}{2}(L)\frac{M_0}{EI} = \frac{M_0 L}{2EI} \qquad d = \frac{1}{3}L$$

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.





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

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

$$= -\frac{M_0 L^2}{16EI}$$

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

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