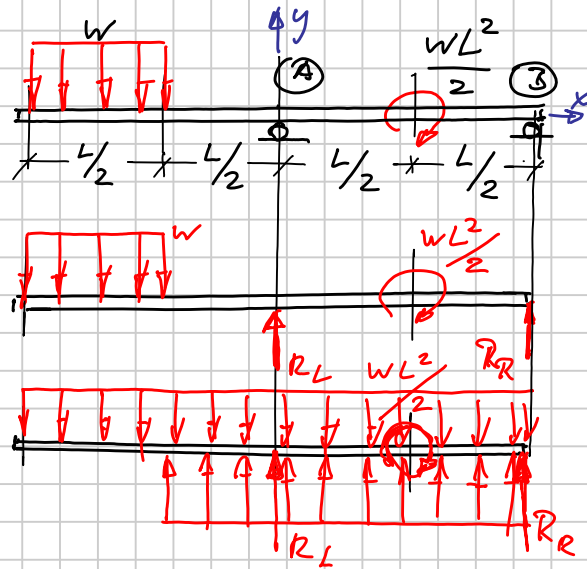


# SINGULARITY FUNCTIONS

Note Title

1/16/2008

STATIC SYSTEM



FREE BODY (I)

FREE BODY (II)

EQUILIBRIUM EQUATION:

$$\sum M_B = 0 \rightarrow R_L = \frac{3WL}{8} \uparrow$$

DIFFERENTIAL EQUATION DESCRIBING M(x):

$$EI \frac{d^2V}{dx^2} = -\frac{w}{2}(x+L)^2 + \frac{w}{2} \left\langle x + \frac{L}{2} \right\rangle^2 + 3\frac{wL}{8} \langle x-0 \rangle^1 + \frac{wL^2}{2} \left\langle x - \frac{L}{2} \right\rangle^0$$

$$EI \frac{dV}{dx} = -\frac{w}{6}(x+L)^3 + \frac{w}{6} \left\langle x + \frac{L}{2} \right\rangle^3 + 3\frac{wL}{16} \langle x-0 \rangle^2 + \frac{wL^2}{2} \left\langle x - \frac{L}{2} \right\rangle^1 + C_1$$

$$EI V = -\frac{w}{24}(x+L)^4 + \frac{w}{24} \left\langle x + \frac{L}{2} \right\rangle^4 + \frac{wL}{16} \langle x-0 \rangle^3 + \frac{wL^2}{4} \left\langle x - \frac{L}{2} \right\rangle^2 + C_1 x + C_2$$

BOUNDARY CONDITIONS:

$$V = 0 \text{ at } x = 0$$

$$V = 0 \text{ at } x = L \quad (\text{NOTE: ORIGIN OF } x\text{-}y\text{-SYSTEM})$$

CONSTANTS:

$$C_1 = \frac{7}{24} wL^3$$

$$C_2 = \frac{5}{128} wL^4$$

DEFLECTION AT TIP:

$$V = -\frac{97}{384} \frac{wL^4}{EI} = \frac{97}{384} \frac{wL^4}{EI} \downarrow$$