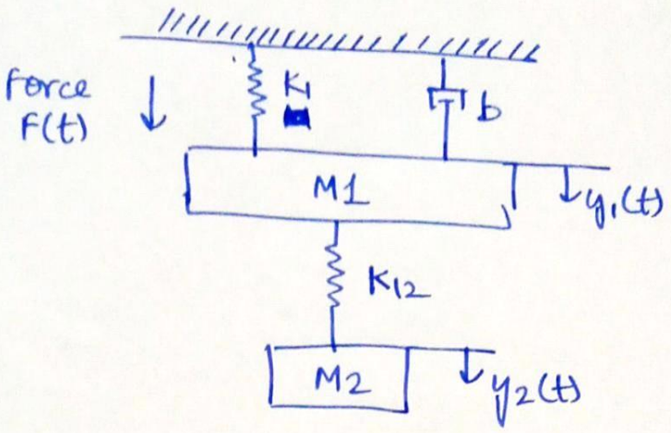
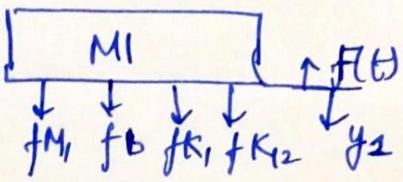
From figure 1, we have,



FBD of mass M1,

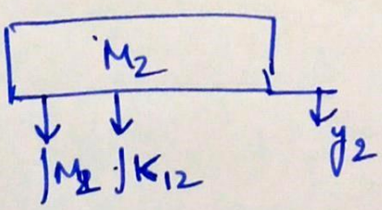


where, $f_{M_1} = M_1 \frac{d^2y_1}{dt^2}$, $f_b = B\frac{dy_1}{dt}$, $f_{K_1} = K_1 y_1$, $f_{K_{12}} = K_{12}(y_1 - y_2)$

$\therefore \quad f_{M_1} + f_b + f_{K_1} + f_{K_{12}} = F(t)$

$\therefore \quad M_1 \frac{d^2y_1}{dt^2} + B\frac{dy_1}{dt} + K_1 y_1 + K_{12}(y_1 - y_2) = F(t) \quad \text{---} \ (1)$

FBD of mass M2,



where, $f_{M_2} = M_2 \frac{d^2y_2}{dt^2}$

$f_{K_{12}} = K_{12}(y_2 - y_1)$

$\therefore \quad f_{M_2} + f_{K_{12}} = 0$

$\therefore \quad M_2 \frac{d^2y_2}{dt^2} + K_{12}(y_2 - y_1) = 0 \quad \text{---} \ (2)$