Project task 2

July 20, 2025   12:42 PM

$\downarrow X_2$

m

K C

$\downarrow X_1$

Floor signal

m

$K(X_1 - X_2)$ $C(\dot{X}_1 - \dot{X}_2)$

$\uparrow K(X_1 - X_2)$ $\uparrow C(\dot{X}_1 - \dot{X}_2)$
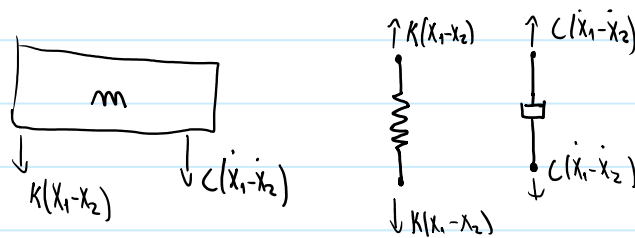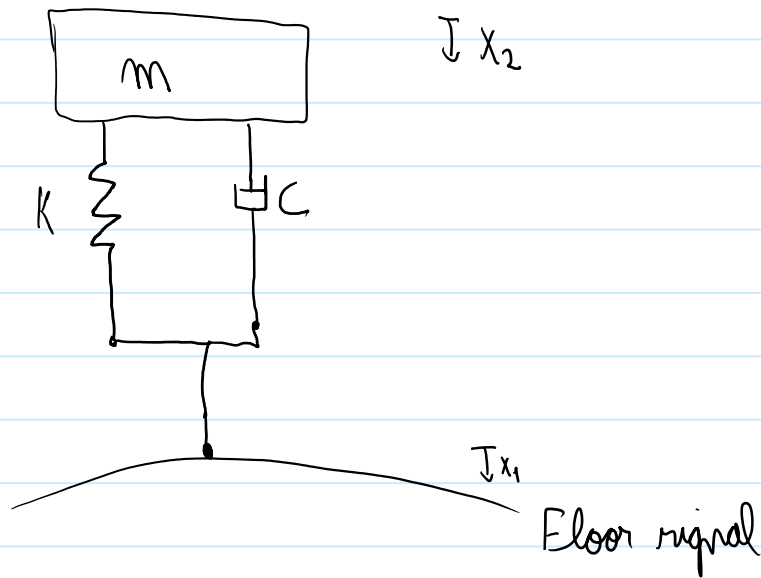
$\downarrow K(X_1 - X_2)$ $\downarrow C(\dot{X}_1 - \dot{X}_2)$

$m\ddot{X}_2 = K(X_1 - X_2) + C(\dot{X}_1 - \dot{X}_2)$

$m\ddot{X}_2 + C\dot{X}_2 + KX_2 = KX_1 + C\dot{X}_1$

$\Downarrow$

Laplace

$\Downarrow$

$mS^2 X_2 + CSX_2 + KX_2 = KX_1 + CSX_1 + F(s)$

$$X_2 = \frac{1}{m} \frac{1}{S} \frac{1}{S} \left(K(X_1 - X_2) + CS(X_1 - X_2) \right)$$

Input: X_1

$$\frac{X_2}{X_1} = \frac{(K + CS)}{S^2 m + CS + K}$$

Input: X_1

Output X_2

$$\frac{\overline{}}{X_1} = \frac{}{S^2m + CS + K}$$

→ derivative block
↳ possible in MATLAB

X_1 → ⊕ → [C]—[S], [k] → ⊕ → [1/m] [1/S] [1/S] → X_2