Mid Sem: Systems Thinking

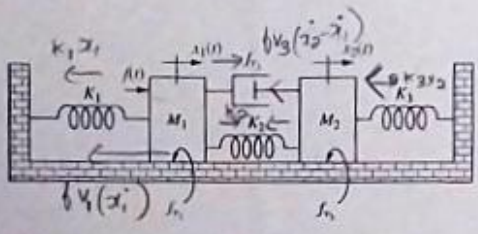
Instruction: Ignore the terms 'CO', these are for admin purpose

(Q1). Consider the following system:

$$G(s) = \frac{C(s)}{R(s)} = \frac{1}{s^2 + 3s + 2} \tag{1}$$

Draw two separate block diagrams for the above transfer function, one in series and one in parallel connection, to represent state-space formulation. [25 + 25]. (CO: 1, 3)

(Q2).



where f_{v1} and f_{v2} are viscous friction coefficients and f_{v3} is damping constant. For this system

(1) Derive the transfer function $G(s) = \frac{X_2(s)}{F(s)}$, where $F(s)$ is the transfer function of f_1. [75] (CO: 2, 3)

(2) Derive a state-space model with x_1 as output. **[note that states should not be taken as a combination of position and/or velocity of M_1, M_2]** [75] (CO: 3)