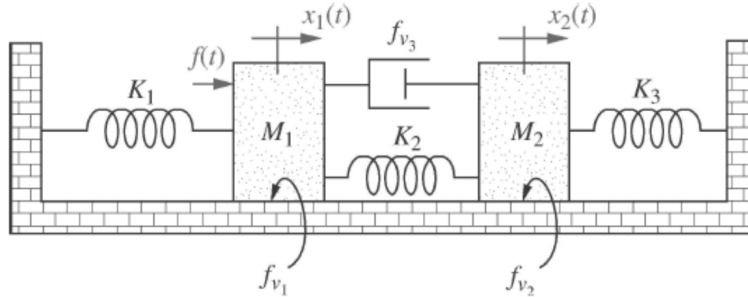# QUIZ 1 (M25): Systems Thinking

Consider the following system shown in the figure below:

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

1. Derive the transfer function
$$G(s) = \frac{X_2(s)}{F(s)}.$$

2. Derive a state-space model with x_1 as the output.

   Note: The states should not be taken as a combination of position and/or velocity of M_1 and M_2.

3. Draw the block diagram representation of the system.