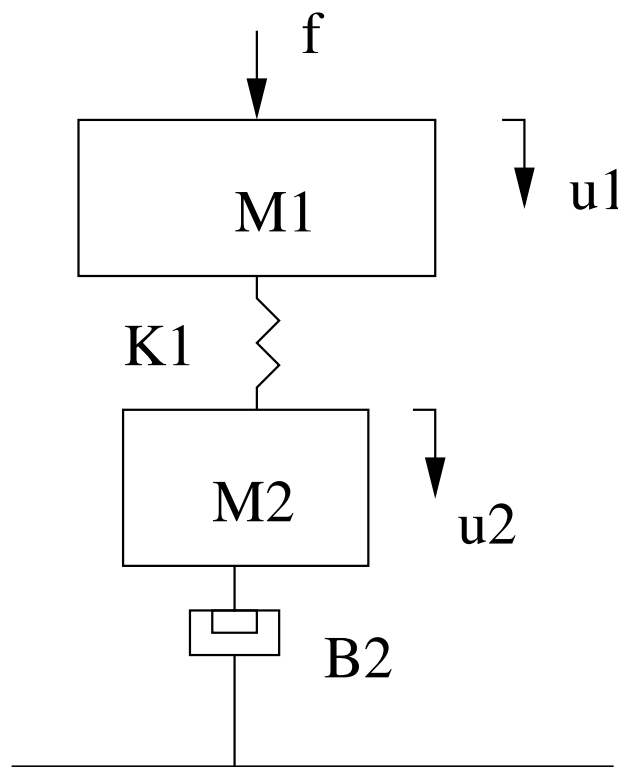


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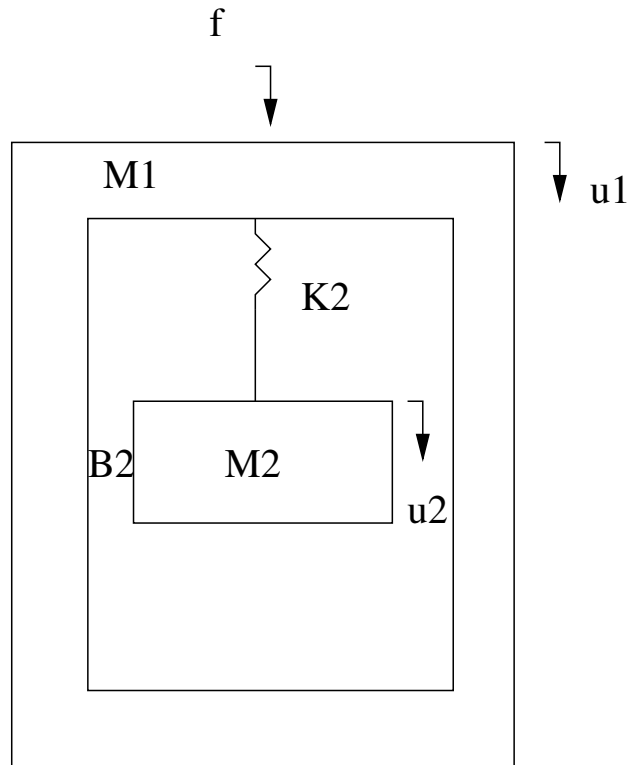
EECE 4130 Problem Set #1

1. Consider the mechanical system. The velocity of the masses are given by  $u$  and applied force by the variable  $f$ . The variables  $k$  represent the mechanical stiffness,  $M$  the mass and  $b$  the damping coefficient.



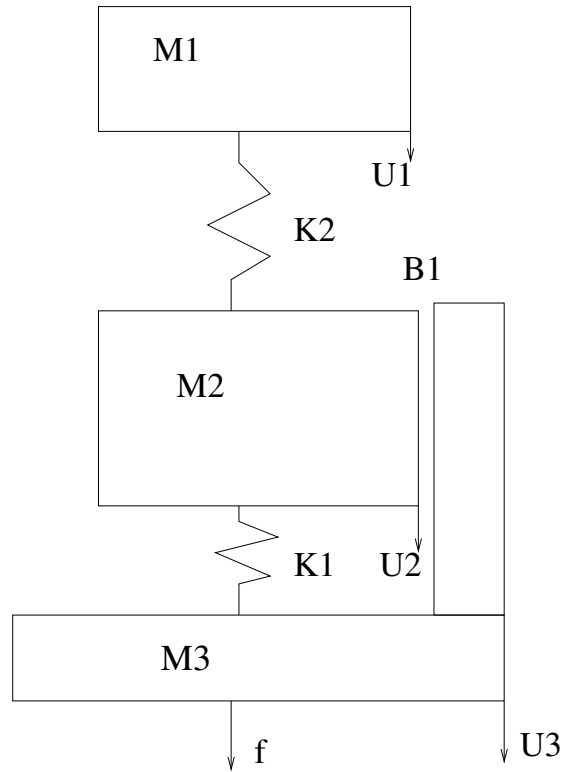
- a. Using mobility analogy where the velocity as the "across" variable, determine the equivalent circuit for the system.
- b. Determine the equations of motion in the Laplace domain.
- c. Determine the equations of motion in the time-domain.
- d. Determine  $U_2(s)/U_1(s)$  the equation of motion in the Laplace domain.

2. Consider the mechanical system. The velocity of the masses are given by  $u$  and applied force by the variable  $f$ . The variables  $k$  represent the mechanical stiffness,  $M$  the mass and  $b$  the damping coefficient.



- Using mobility analogy where the velocity as the "across" variable, determine the equivalent circuit for the system.
- Determine the equations of motion in the Laplace domain.
- Determine the equations of motion in the time-domain.
- Determine the transfer function  $U_2(s)/U_1(s)$ .

3. Using mobility analogy where the velocity as the "across" variable, determine the an equivalent circuit for the system.



- Determine the equations of motion in the Laplace domain.
- Determine the equations of motion in the time-domain.