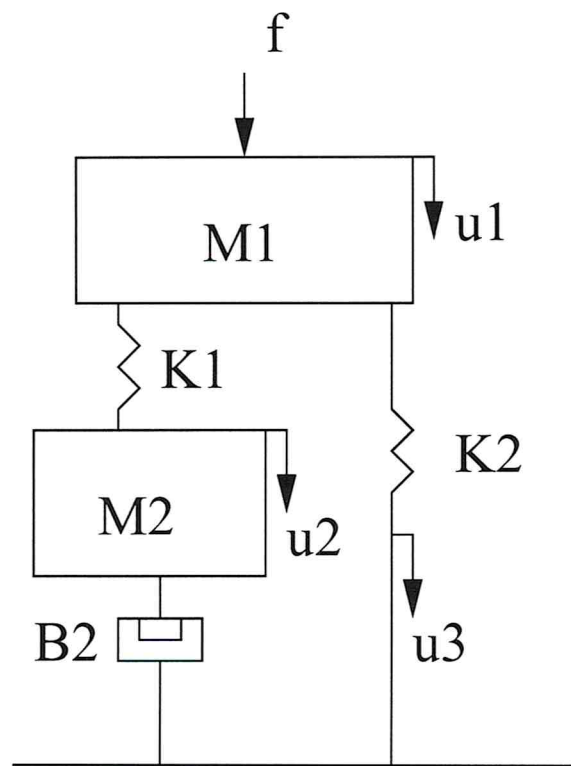


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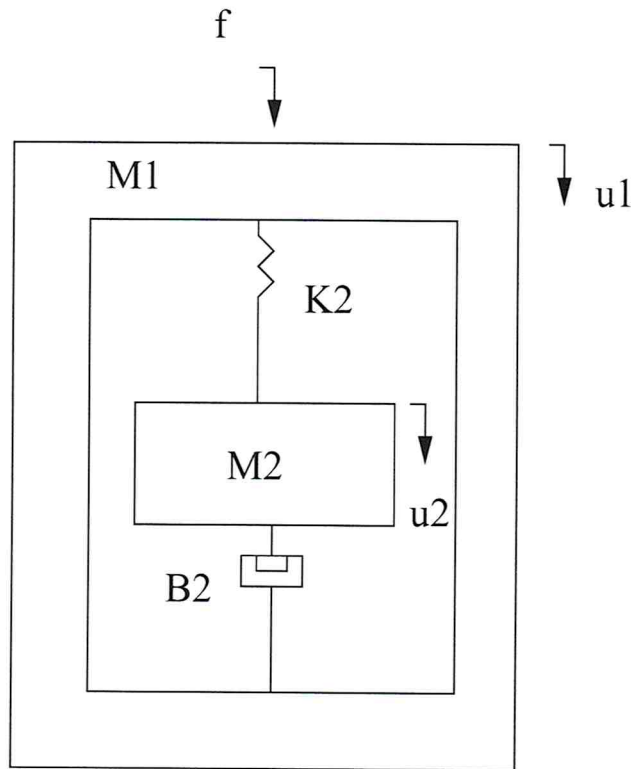
16.413 Problem Set #1

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.



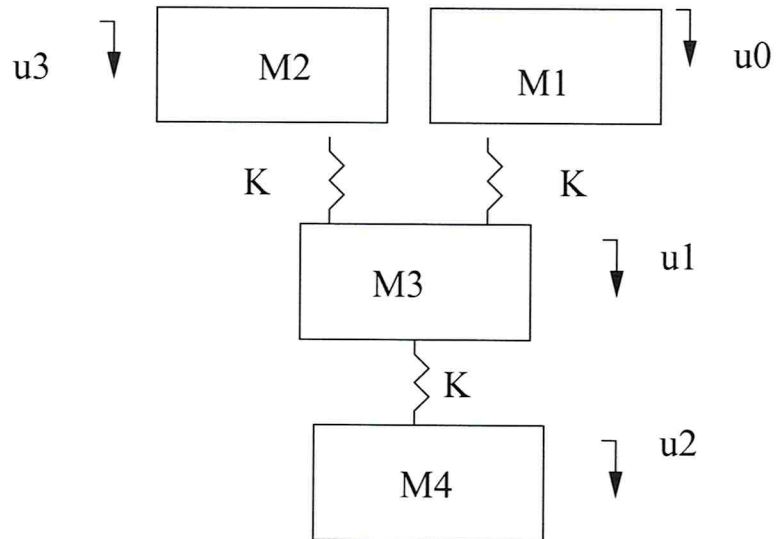
- Using mobility analogy where the velocity as the "across" variable, determine the an equivalent circuit for the system.
- Determine the equations of motion in the Laplace domain.
- Determine the equations of motion in the time-domain.
- Determine $U_2(s)/U_1(s)$ the equation of motion in the Laplace 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 an 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.
- Determine the transfer function $U_2(s)/U_0(s)$.