

# Homework 1

## Question 1

A typical input variable is identified for each of the following examples of dynamic systems. Give at least one output variable for each system.

1. **Human Body:** neuro-electric pulses.
2. **Company:** information.
3. **Power Plant:** fuel rated.
4. **Automobile:** steering wheel movement.
5. **Robot:** applied voltage to joint motor.
6. **Highway Bridge:** vehicle force.

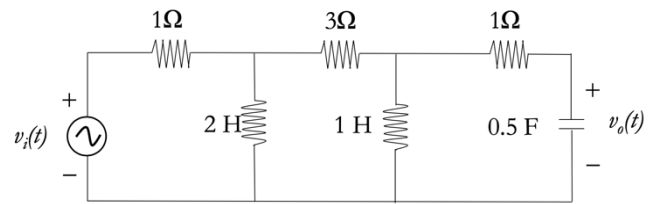
Also, indicate other possible inputs.

## **Question 2**

Give four categories of uses of dynamic modeling. List advantages and disadvantages of experimental modeling over analytical modeling.

### Question 3

Represent the electrical network in state space where  $v_o(t)$  is the output.



#### Question 4

Please find the state space model for the mechanical system below, assuming  $f(t)$  as input,  $x_1(t)$  and  $x_2(t)$  as the outputs.

