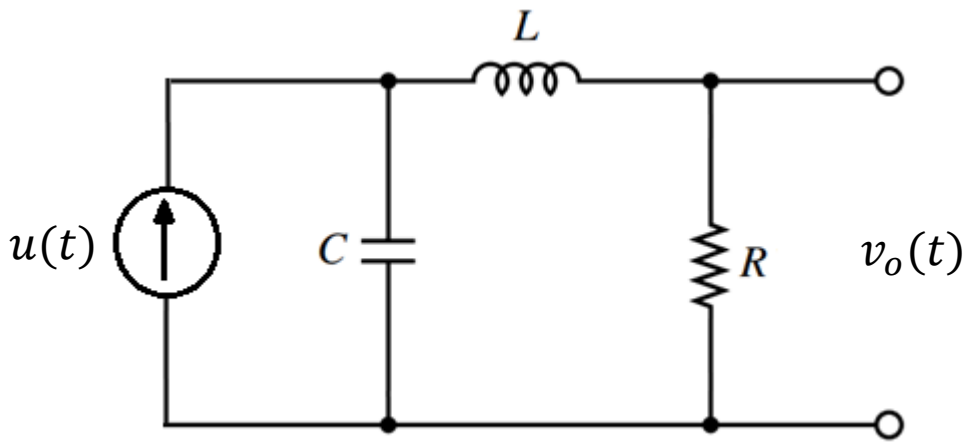
General Notes:

- Show steps clearly.
- Duplicate submissions are not accepted and will result in a zero grade for both the original and the duplicate.
- Late submission policy is that 25% of the grade will be deducted per day.
- Deadline: December 27th, 23:59.

Problem 1

Derive the transfer function $V_o(s)/U(s)$ for the following circuit using:

- State-space representation and Laplace Transform. Draw the state diagram.



Problem 2

Obtain the state-space representation of the following system in the **Controllable**, **Observable**, and **Diagonal** canonical forms. Draw the state diagram of each form.

$$\frac{Y(z)}{U(z)} = \frac{z^2 - 2z + 3}{z^3 + 7z^2 + 14z + 8}$$