

- When turn in your homework, please write down: 作業次別, 姓名, 學號, 系級, 日期
- Assigned: 12/17/08, Due on 12/24/08

• (Minimal Realization)

3 (A parallel electrical circuit)

20 points

- If $L_1 = L_2, C_1 = C_2, R_1 = R_2$, and $c = [0, 0, 0, 1]$, show that the state-space model is **NOT** a **minimal realization** and find a **minimal realization** from the state-space model. You also need to show that the realization you find is **minimal**.

5 (A 3-tank system)

20 points

- If the three-tank system is with only input u_2 and output x_2 , then A, B, C, D of the state-space model is given in the following.

$$A = \begin{bmatrix} -3 & 3 & 0 \\ 2 & -4 & 2 \\ 0 & 3 & -3 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, C = [0 \ 1 \ 0], D = [0],$$

Show that the state-space model is **NOT** a **minimal realization** and find a **minimal realization** from the state-space model. You also need to show that the realization you drive is **minimal**.