EE610

11/12/13

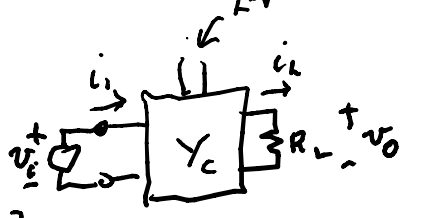
Note Title 11/12/2013

Synthesis of $v_o(s)/v_i$ from state:

$$\frac{v_o}{v_i} = \frac{3}{s^2+\sqrt{2}s+1}$$

$$\dot{x} = \begin{bmatrix} 0 & 1 \\ -1 & -\sqrt{2} \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} v_i$$

$$R_L i_o = v_o = \begin{bmatrix} 3 & 0 \end{bmatrix} x + [0]\, v_i$$



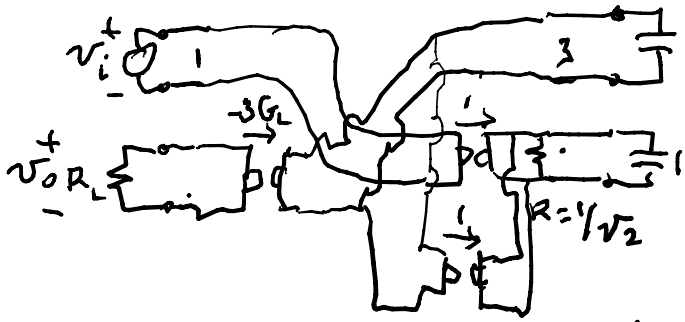
$$\begin{bmatrix} i_1 \\ i_2 \\ -\dot{x} \end{bmatrix} = \left[\begin{array}{cc|c} 0 & 0 & 0 \quad 1 \\ 0 & 0 & -G_L 3 \quad 0 \\ \hline 0 & +3G_L & 0 \quad -1 \\ -1 & 0 & 1 \quad \sqrt{2} \end{array}\right] \begin{bmatrix} v_i \\ v_o \\ x \end{bmatrix} \qquad x = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

can always find a Q such that

$$QAQ^{-1} + Q^{-T}A^TQ^T = -LL^T$$

$$\Rightarrow \quad \hat{x} = Qx \qquad \text{here } Q = I_2$$

$$Y_c = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 0 & 0 & -3G_L & 0 \\ 0 & 3G_L & 0 & -1 \\ -1 & 0 & 1 & 0 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \sqrt{2} \end{bmatrix}$$



passive realization as $Y_c + Y_c^T \geq 0$

(positive semi-definite)