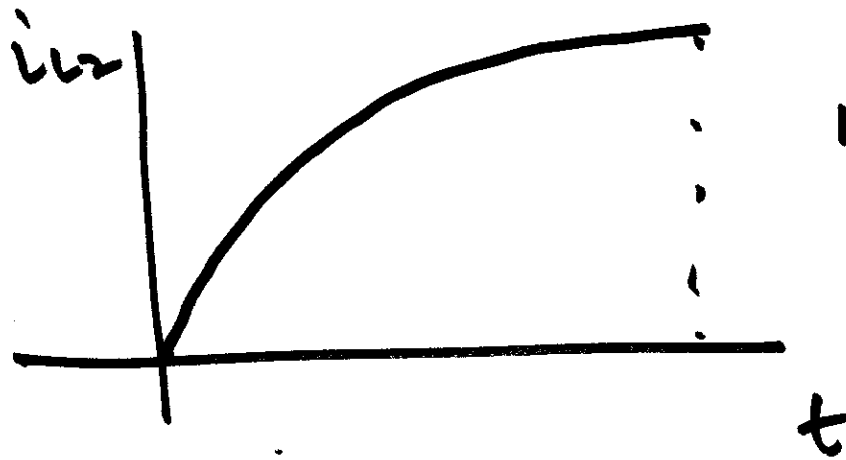
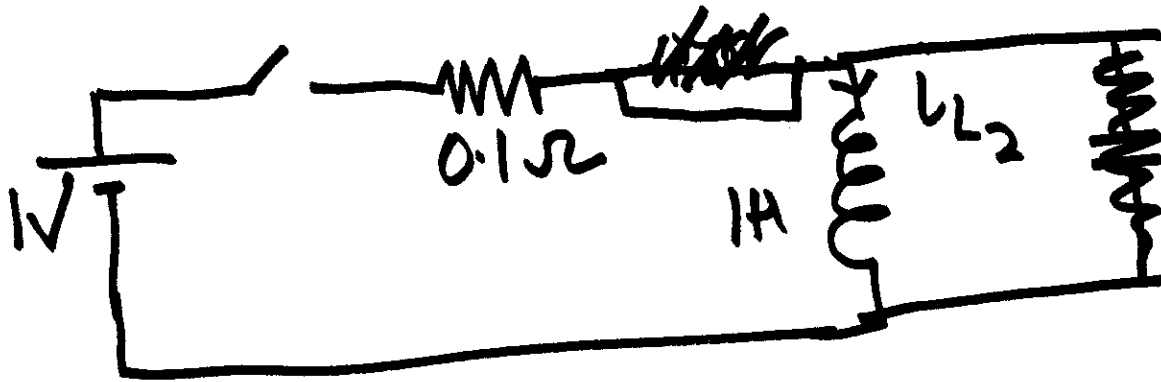


$$|\lambda| = 0.1$$

$$T = 10 \text{ s}$$

$$40$$



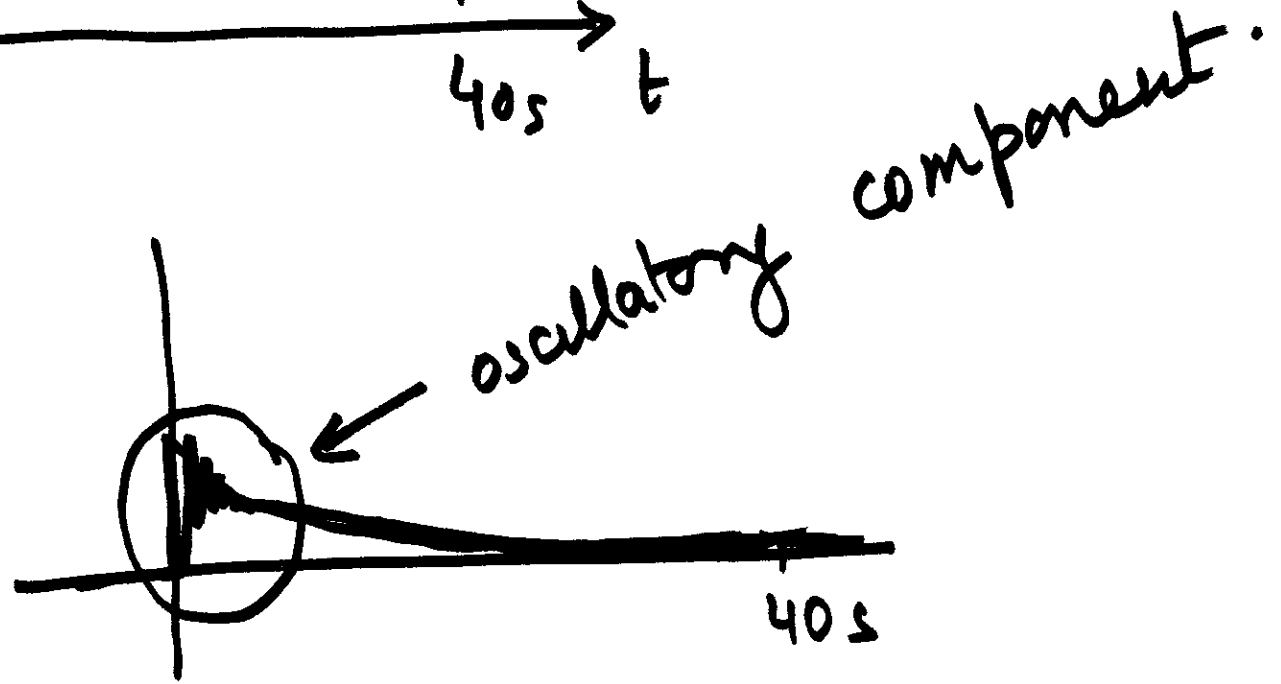
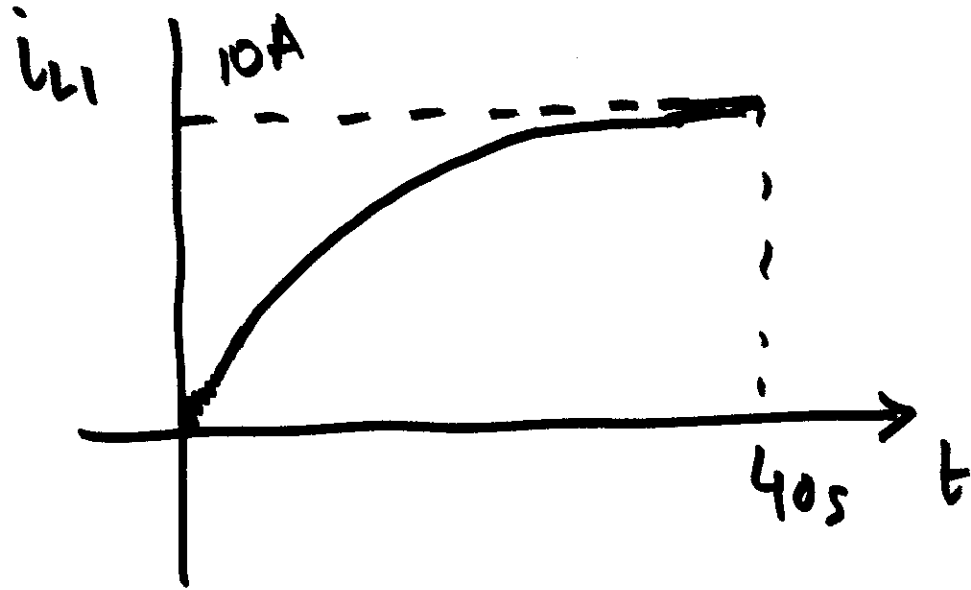
$$\lambda \leftarrow -0.1$$

105

$$\begin{bmatrix} \frac{di_{L_1}}{dt} \\ \frac{di_{L_2}}{dt} \\ \frac{dV_C}{dt} \end{bmatrix} = \begin{bmatrix} -10 & 0 & -100 \\ 0 & 0 & 0 \\ +10000 & -10000 & 0 \end{bmatrix} \begin{bmatrix} i_{L_1} \\ i_{L_2} \\ V_C \end{bmatrix} + \begin{bmatrix} 100 \\ 0 \\ 0 \end{bmatrix}$$

$$\frac{di_{L_2}}{dt} = 0$$

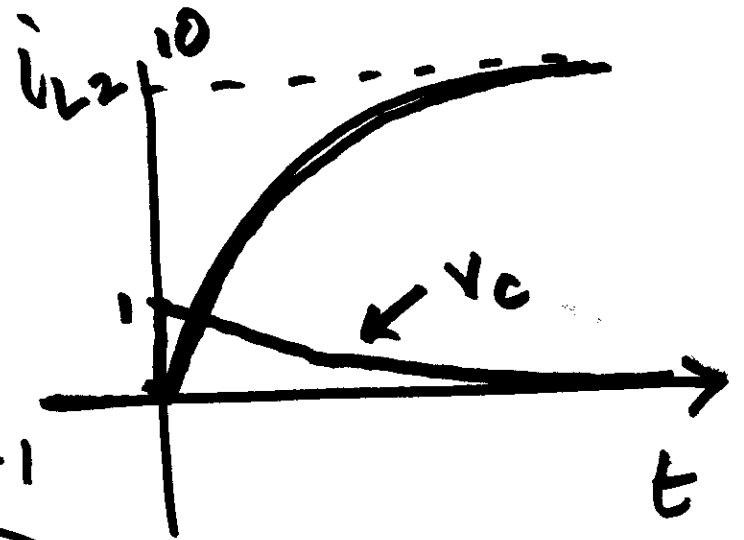
$$\Rightarrow i_{L_2}(t) = i_{L_2}(0)$$



$$\begin{array}{l} \rightarrow \\ \rightarrow \end{array} \begin{bmatrix} \frac{di_{L1}}{dt} \\ \frac{di_{L2}}{dt} \\ \frac{dV_C}{dt} \end{bmatrix} = \begin{bmatrix} 0 \\ \frac{di_{L2}}{dt} \\ 0 \end{bmatrix} = \begin{bmatrix} -10 & 0 & -100 \\ 0 & 0 & 1 \\ 10000 & -10000 & 0 \end{bmatrix} \begin{bmatrix} i_{L1} \\ i_{L2} \\ V_C \end{bmatrix} + \begin{bmatrix} 100 \\ 0 \\ 0 \end{bmatrix}$$

$$\frac{di_{L2}}{dt} = V_C, \quad \textcircled{i_{L1} = i_{L2}}, \quad V_C = ?$$

$$-10i_{L1} - 100V_C + 100 = 0$$



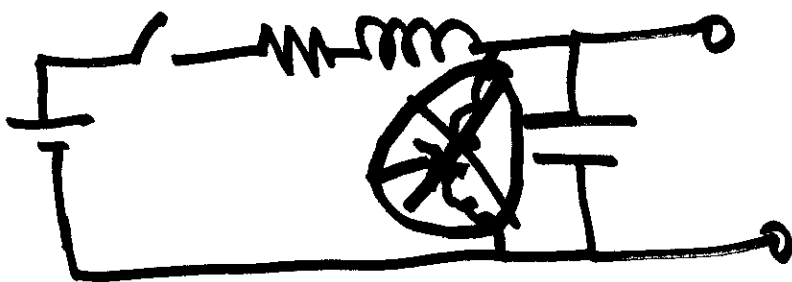
$$-100V_C = -100 + 10 i_{L1}$$

$$V_C = 1 - 0.1 i_{L2}$$

i_{L1} & V_C algebraically related i_{L2} .

$$\frac{di_{L2}}{dt} = 1 - 0.1 i_{L2} \quad \checkmark$$

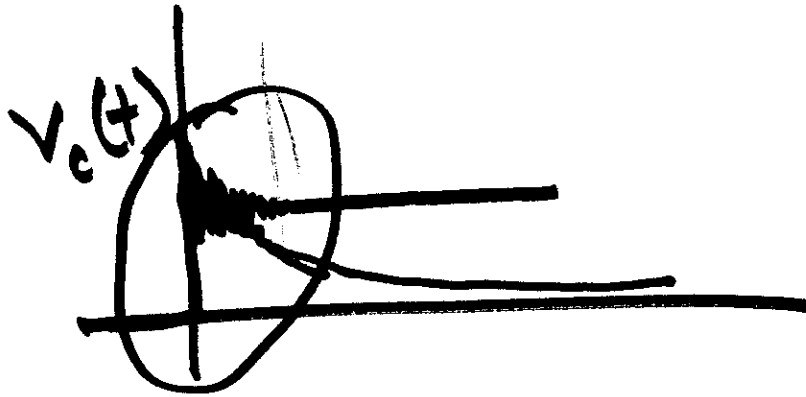
$$\begin{bmatrix} \frac{di_{L1}}{dt} \\ \frac{dV_C}{dt} \end{bmatrix} = \begin{bmatrix} -10 & -100 \\ 10000 & 0 \end{bmatrix} \begin{bmatrix} i_{L1} \\ V_C \end{bmatrix} + \begin{bmatrix} 100 \\ 0 \\ 0 \end{bmatrix}$$



$$+ \begin{bmatrix} 0 \\ -10000 & i_{L2} \end{bmatrix} \rightarrow 0$$

$$i_L(t) = 0.1 e^{-5t} \sin(999.9t)$$

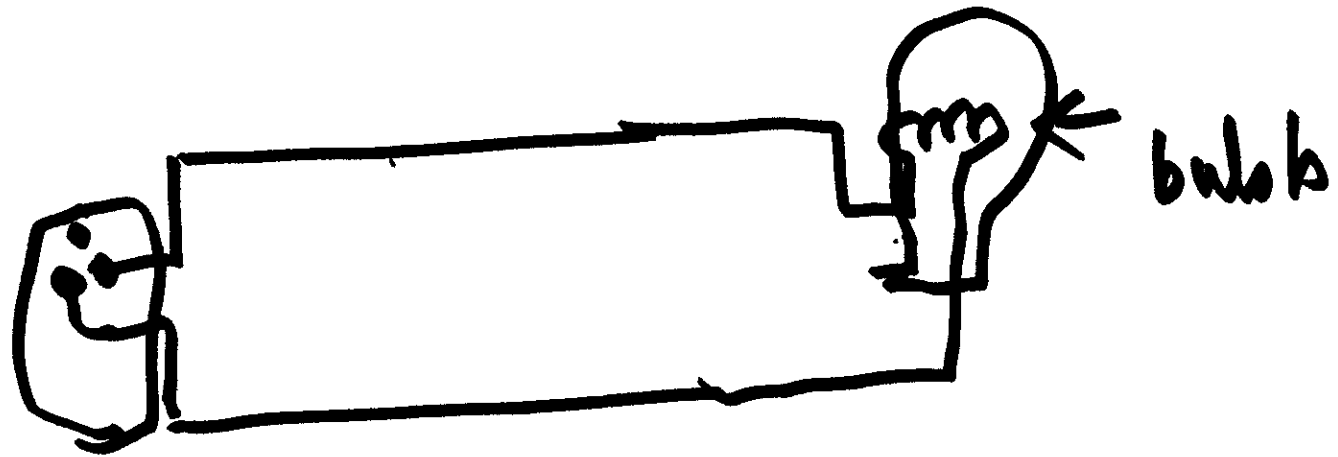
$$v_c(t) = 1 - e^{-5t} \left(\cos(999.9t) + 0.005 \sin(999.9t) \right)$$



$$\begin{aligned} \dot{x}_1 &= f_1(x_1, x_2) \\ \dot{x}_2 &= f_2(x_1, x_2) \end{aligned} \parallel$$

$x_2 \rightarrow$ associated with "fast"
~~transients~~ transients.

$$\begin{aligned} \dot{x}_1 &= f_1(x_1, x_2) \\ 0 &= f_2(x_1, x_2) \leftarrow \end{aligned}$$



$$P = \begin{bmatrix} j0.1 & -j0.1 & -0.7 \\ 0 & 0 & -0.7 \\ 1 & 1 & 0.06 \end{bmatrix}$$

$$Q = P^{-1} = \begin{bmatrix} -j5 & j5 & 0.5 \\ +j5 & -j5 & 0.5 \\ -0.015 & ~~1~~ -1.403 & 0 \end{bmatrix}$$

PARTICIPATION MATRIX

$$\begin{array}{l}
 \underline{P}^{-1} * \underline{P}^{-1T} = \begin{array}{ccc}
 \begin{array}{l} \lambda_1 \\ \downarrow \checkmark \end{array} & & \begin{array}{l} \lambda_2 \\ \downarrow \checkmark \end{array} & \begin{array}{l} \lambda_3 \text{ SLOW} \\ \downarrow \checkmark \end{array} \\
 \begin{array}{l} \dot{i}_{L1} \rightarrow \\ \hline \dot{i}_{L2} \rightarrow \\ v_C \rightarrow \end{array} & \left[\begin{array}{ccc}
 0.5 & 0.5 & 0 \\
 0 & 0 & \underline{1} \\
 0.5 & 0.5 & 0
 \end{array} \right] & & \\
 \dot{i}_{L1} \ \& \ v_C \rightarrow & & \dot{i}_{L2} \rightarrow \text{slow}
 \end{array}$$