EE 334
Response of LTI Circuits to AC and DC Inputs

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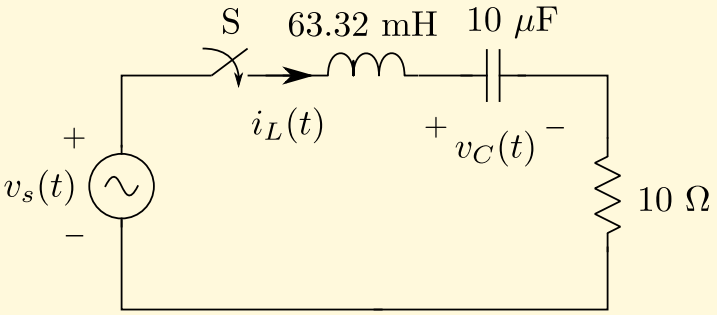
1. An Example



The state space equations are

$$\frac{d}{dt}\begin{bmatrix} i_L \\ v_C \end{bmatrix} = \begin{bmatrix} -\frac{R}{L} & -\frac{1}{L} \\ \frac{1}{C} & 0 \end{bmatrix}\begin{bmatrix} i_L \\ v_C \end{bmatrix} + \begin{bmatrix} \frac{1}{L} \\ 0 \end{bmatrix} v_s$$

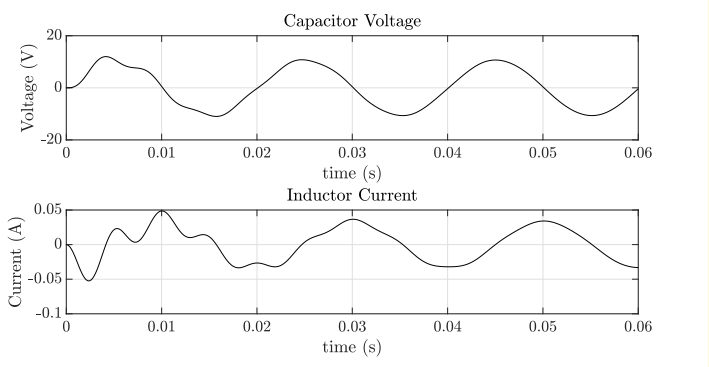
$$v_s(t) = 10\sin(2\pi \times 50t) \text{ V.}$$

$$A = \begin{bmatrix} -157.92 & -15.792 \\ 10^5 & 0 \end{bmatrix}$$

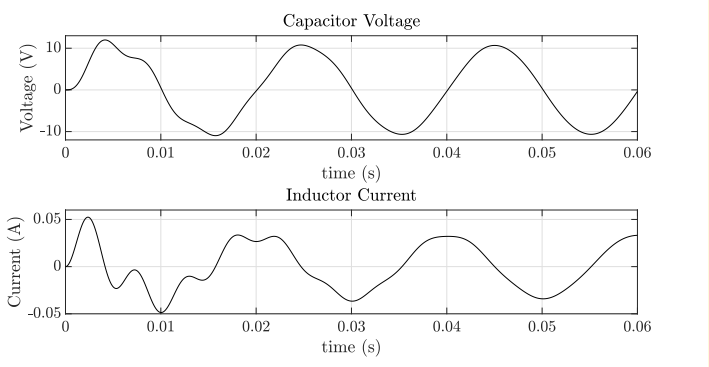
$i_L(0) = v_c(0) = 0.$

Characteristic Equation: $s^2 + 157.92s + 1579200 = 0.$

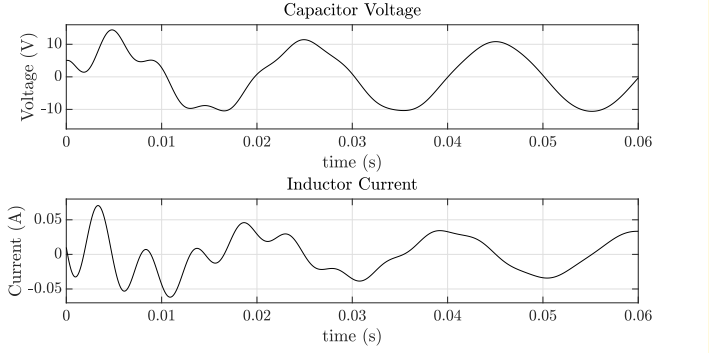
Eigenvalues $\lambda = -78.96 \pm j1254$



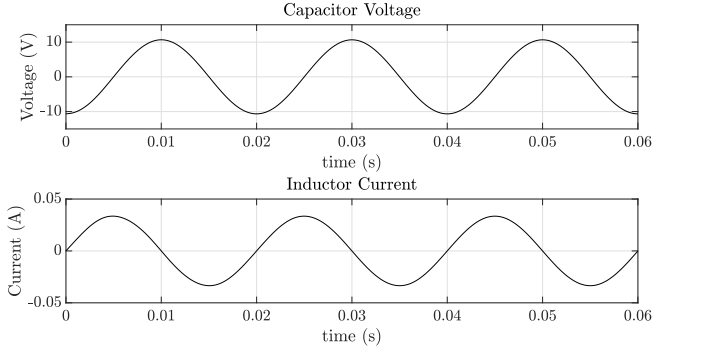
Option A



Option B



Option C



Option D