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Circuit and System Analysis

Exercise for Week-3

1. The circuit which is given in Figure 1 is in sinusoidal steady-state and $R = 1\Omega$, $C = 2F$, $L = 0.5H$ and $g = 1$.

- (a) Write modified (generalized) node equations (in matrix form).
(b) Show that the transfer function $H(j\omega) = \frac{V_L}{E}$ is

$$H(j\omega) = \frac{\omega^2}{2 - \omega^2 + 2j\omega}$$

- (c) Calculate the steady-state response of $v_L(t)$ for $e(t) = 5 \sin(t)$.
(d) Confirm the result which is obtained in (c) using a computer program such as Spice.

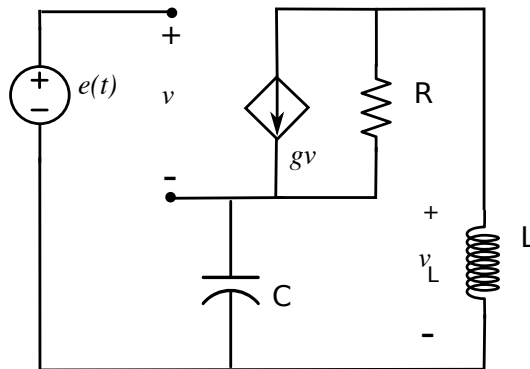


Figure 1