

HOMEWORK VII

Question 1 Refer to HW-3/Q4. Transform the circuit to the s-domain and obtain the s-domain mesh equation.

Question 2 Refer to HW-3/Q5. Transform the circuit to the s-domain and obtain the s-domain node equation.

Question 3 Refer to HW-3/Q6. For $\alpha = 2$ mho, transform the circuit to the s-domain and obtain the s-domain node equation.

Question 4 Refer to HW-3/Q7. Transform the circuit to the s-domain and obtain the s-domain node and mesh equations.

Question 5 Refer to HW-3/Q8. Transform the circuit to the s-domain and obtain the s-domain node and mesh equations.

Question 6 Refer to HW-3/Q9. Transform the circuit to the s-domain and obtain the s-domain modified node equation.

Question 7 Refer to HW-3/Q10. Transform the circuit to the s-domain and obtain the s-domain node equation.

Question 8 Refer to HW-3/Q11. Transform the circuit to the s-domain and obtain the s-domain node and mesh equations.

Question 9 Refer to the circuit of HW-2/Q9. Let $K = 4$ mho, $v_C(0) = V_0$, $i_L(0) = I_0$.

- a) Transform the circuit to the s-domain and obtain the s-domain node equation.
- b) Solve the node equation and express $V_C(s)$ and $I_L(s)$ in terms of the Laplace transforms of inputs, V_0 , and I_0 .
- c) Find the zero-input solutions for $v_C(t)$ and $i_L(t)$ given $V_0 = 7$ V and $I_0 = 4$ A.
- d) Given $v_{s1}(t) = 8u(t)$ V and $i_{s2}(t) = 3e^{6t}u(t)$ A, find the zero-state solutions for $v_C(t)$ and $i_L(t)$.
- e) Given $v_{s1}(t) = 0$ and $i_{s2}(t) = 3e^{4t}u(t)$ A, find the zero-state solutions for $v_C(t)$ and $i_L(t)$.
- f) Given $v_{s1}(t) = 0$ and $i_{s2}(t) = 3e^{4t} \cos(2t + 32^\circ) u(t)$ A, find the zero-state solutions for $v_C(t)$ and $i_L(t)$.

Question 10 A linear time-invariant dynamic circuit includes a single independent source. The step response for a voltage or a current $x(t)$ is: $(1 + e^{-4t})u(t)$.

- a) Find the impulse response $h(t)$ for $x(t)$.
- b) Find the zero-state response $x_{zs}(t)$ to the input $u_s(t) = 8\cos(4t + 15^\circ)u(t)$ by Laplace transformation.