ECE 2210 / 00
Exam 2

Useful Information

$C = \frac{Q}{V}$ $\quad v_C = \frac{1}{C}\cdot\int_{-\infty}^{t} i_C\,dt = \frac{1}{C}\cdot\int_{0}^{t} i_C\,dt + v_C(0)$ (initial voltage) $\quad \Delta V_C = \frac{1}{C}\cdot\int_{t_1}^{t_2} i_C\,dt$

$\text{farad} = \frac{\text{coul}}{\text{volt}} = \frac{\text{amp}\cdot\text{sec}}{\text{volt}}$ $\quad i_C = C\cdot\frac{d}{dt}v_C$

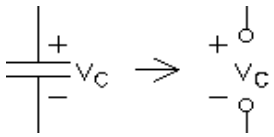
parallel: $C_{eq} = C_1 + C_2 + C_3 + \ldots$ $\quad$ **series:** $C_{eq} = \frac{1}{\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3}+\ldots}$

$W_C = \frac{1}{2}\cdot C\cdot V_C^2$ $\quad$ Capacitor voltage **cannot** change instantaneously

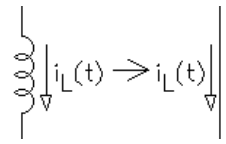
$\text{henry} = \frac{\text{volt}\cdot\text{sec}}{\text{amp}}$ $\quad i_L = \frac{1}{L}\cdot\int_{-\infty}^{t} v_L\,dt = \frac{1}{L}\cdot\int_{0}^{t} v_L\,dt + i_L(0)$ (initial current) $\quad \Delta I_L = \frac{1}{L}\cdot\int_{t_1}^{t_2} v_L\,dt$

$W_L = \frac{1}{2}\cdot L\cdot I_L^2$ $\quad v_L = L\cdot\frac{d}{dt}i_L$ $\quad$ Inductor current **cannot** change instantaneously

Final Conditions:



Replace capacitors with opens



Replace inductors with wires

For all first order transients: $x(t) = x(\infty) + (x(0) - x(\infty))\cdot e^{-\frac{t}{\tau}}$ $\quad \tau = R_{Th}\cdot C$ OR $\frac{L}{R_{Th}}$

Resonance: $\omega_o = \frac{1}{\sqrt{L_{eq}\cdot C_{eq}}}$

Steady-state sinusoidal AC Impedances: $Z_C = \frac{1}{j\cdot\omega\cdot C} = \frac{-j}{\omega\cdot C}$ $\quad Z_L = j\cdot\omega\cdot L$ $\quad \omega = 2\cdot\pi\cdot f$

$A = |\mathbf{A}| = \sqrt{a^2+b^2}$ $\quad \theta = \arg(\mathbf{A}) = \operatorname{atan}\left(\frac{b}{a}\right)$ $\quad a = A\cdot\cos(\theta)$ $\quad b = A\cdot\sin(\theta)$