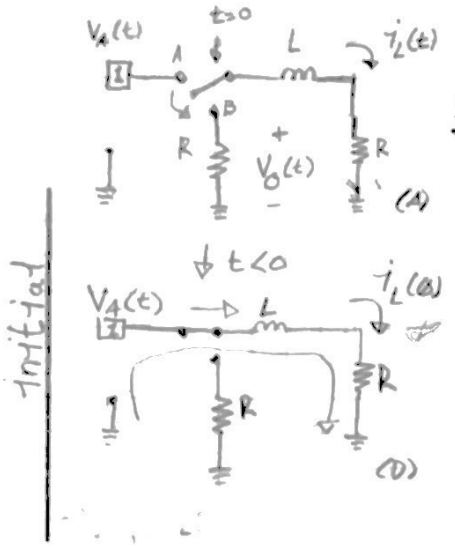
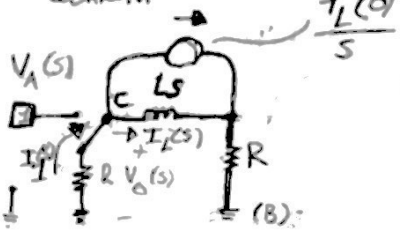
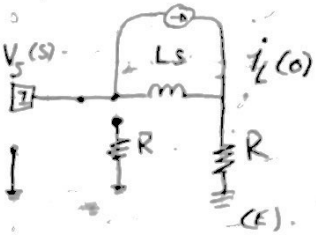
opg 10-19

Tidsdomene

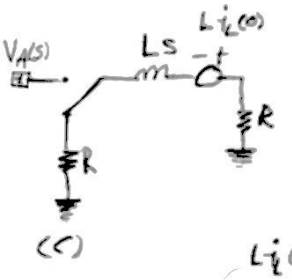


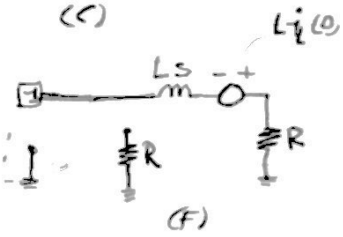
"s-plane" CURRENT





"s-plane" Voltage





$$V_L(s) = Ls \cdot I_L(s) - L \cdot i_L(0)$$

$$I_L(s) = \frac{1}{Ls} \cdot V_L(s) + \frac{i_L(0)}{s}$$

KVL (C), attesson func af s..

$$V_R + V_L - (L \cdot i_L(0^-)) + V_R = 0$$

$$2V_R + V_L - (L \cdot i_L(0) = 0$$

$$2V_R + V_L = L \cdot i_L(0)$$

$$2 \cdot V_R + Ls \cdot I_L = L \cdot i_L(0^-)$$

$$2(R \cdot I_L) + Ls \cdot I_L = L \cdot i_L(0)$$

$$I_L \cdot (2R + LS) = L \cdot i_L(0^-)$$

$$I_L = \frac{L \cdot i(0^-)}{2R + LS}$$

$i_L(0^-) = \frac{V_A}{R}$?

$$I_L(s) = \frac{L \cdot \frac{V_A}{R}}{2 \cdot R + LS} = \boxed{V_A \cdot \frac{L}{R \cdot (2R + L \cdot S)}} = \frac{\frac{V_A}{R}}{s + \frac{2R}{L}}$$

$$\frac{\frac{V_A \cdot L}{R \cdot L}}{\frac{2R^2 + RLS}{RL}} = \frac{\frac{V_A}{R}}{\frac{2R}{L} + S} = I_L(s)$$

$$V_0(s) = -I_L(s) \cdot R$$

$$= \frac{-\frac{V_A}{R}}{\frac{2R}{L} + s} \cdot R = \frac{-V_A}{\frac{2R}{L} + s} = V_0(s)$$

$$\mathcal{L}^{-1}\{V_0(s)\} = -V_A \mathcal{L}^{-1}\left\{\frac{1}{s + \frac{2R}{L}}\right\}$$

$$\alpha = -\frac{2R}{L}$$

$$-V_A \cdot e^{-\frac{2R}{L}} \cdot u(t) = V_0(t)$$

iLAP

$$\mathcal{L}^{-1}\{I_L(s)\} = \frac{V_A}{R} \cdot \mathcal{L}^{-1}\left\{\frac{1}{s + \frac{2R}{L}}\right\} = i_L(t) \quad \alpha = -\frac{2R}{L}$$

$$\boxed{u(t) \cdot \frac{V_A}{R} \cdot e^{-\frac{2R}{L} \cdot t}} = i_L(t) = \mathcal{L}^{-1}\{I_L(s)\}$$