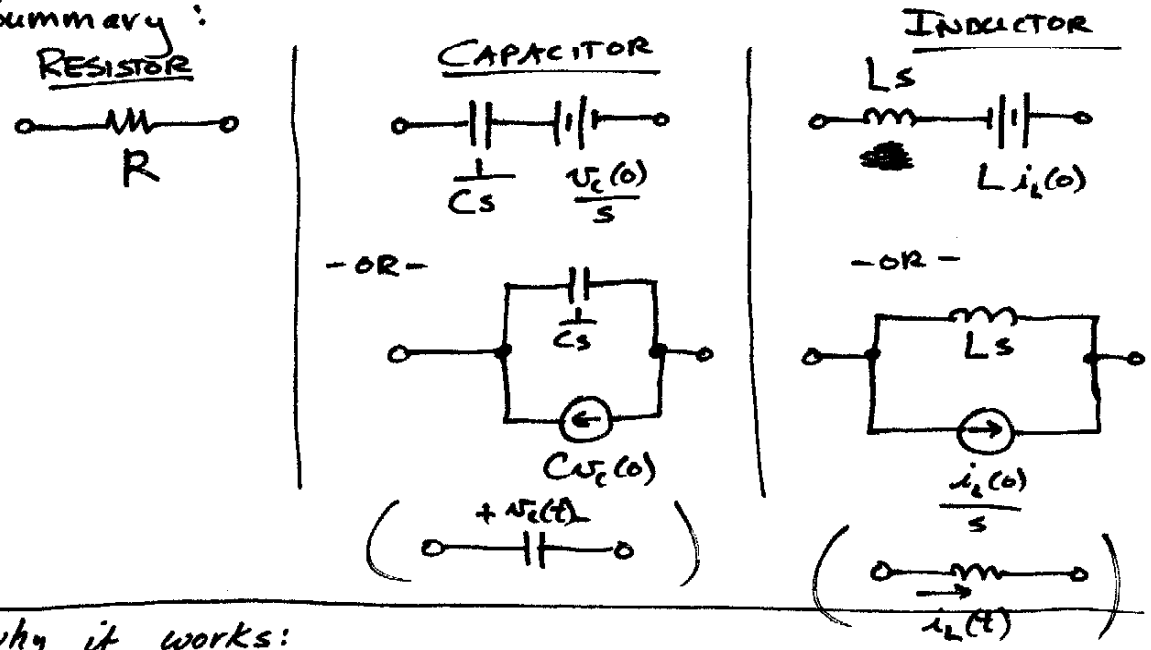
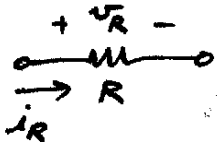
s-Domain Circuit Elements

* Summary:



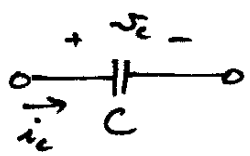
* Why it works:

Resistor



$$v_R = R i_R \quad \overset{\text{L.T.}}{\longleftrightarrow} \quad V_R = R I_R \qquad \text{(Laplace transform)}$$

Capacitor



$$v_c = \frac{1}{C}\int_0^t i_c(x)\,dx + v_c(0) \quad \overset{\text{L.T.}}{\longleftrightarrow} \quad V_c = \frac{1}{C}\frac{I_c}{s} + \frac{v_c(0)}{s}$$

$$i_c = C\frac{dv_c}{dt} \quad \overset{\text{L.T.}}{\longleftrightarrow} \quad I_c = C(sV_c - v_c(0))$$

Inductor

similar analysis as capacitor.