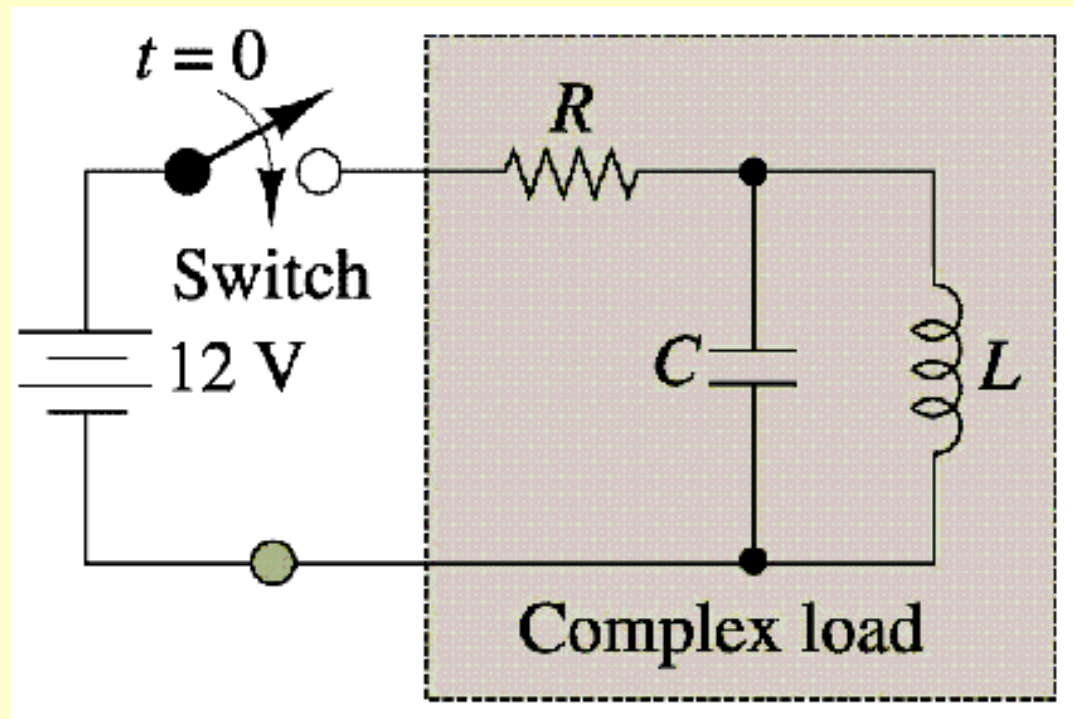


UNIT-1

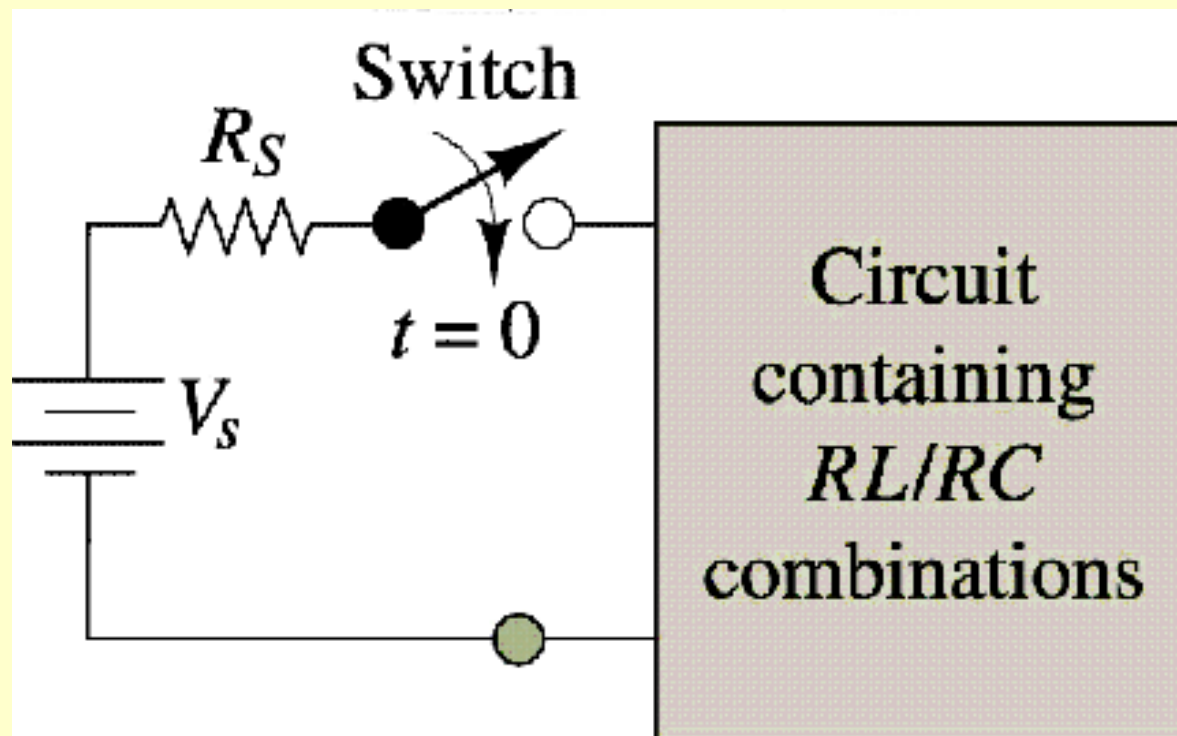
(Lecture-10)

Network Elements, Initial and Final Conditions

Circuit with switched DC excitation



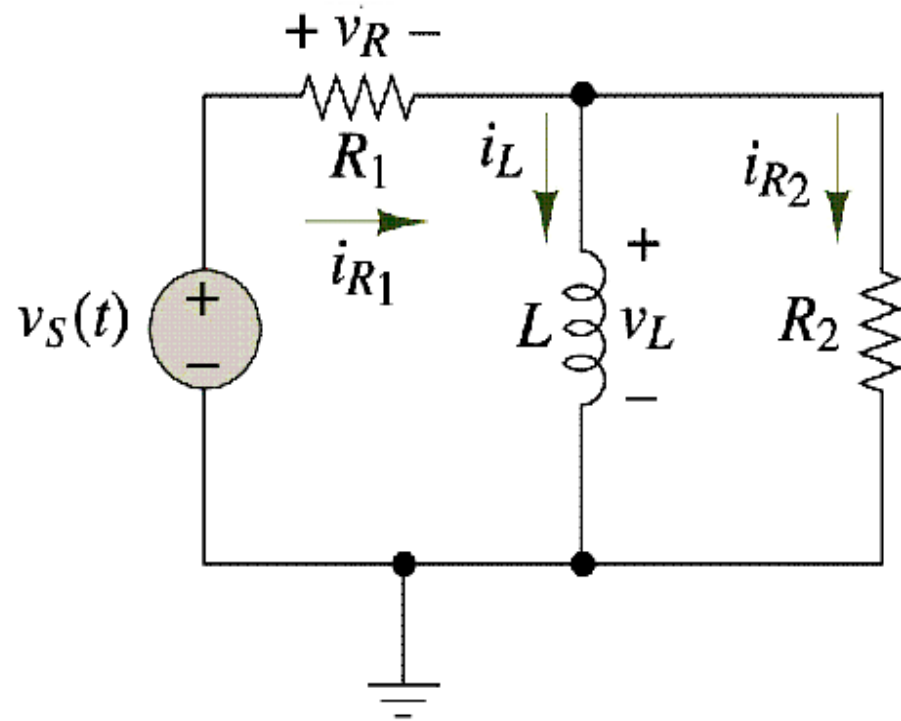
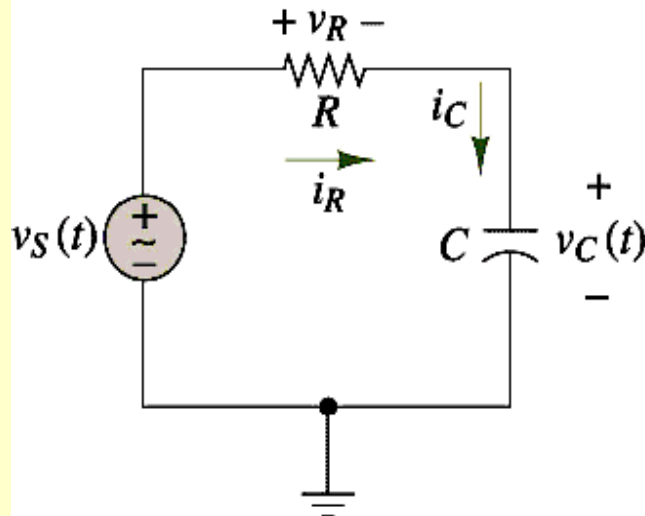
A general model of the transient analysis problem



In general, any circuit containing energy storage element

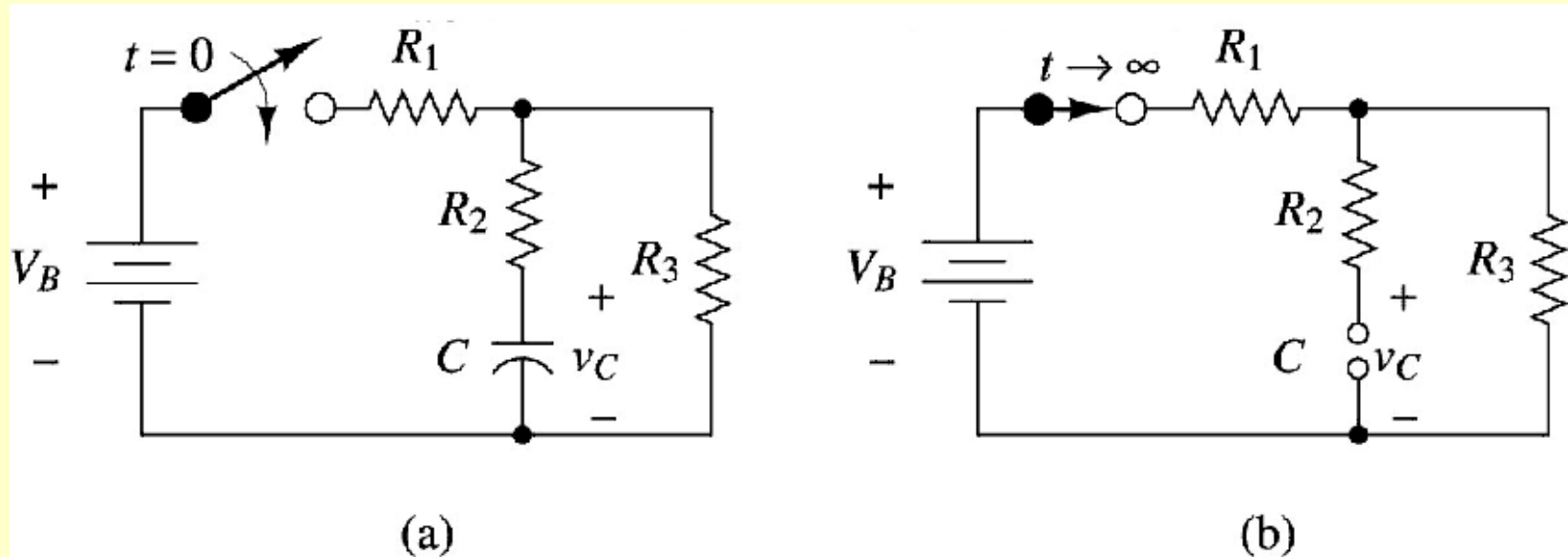
A circuit containing energy-storage elements is described by a differential equation. The differential equation describing the series RC circuit shown is

$$\frac{di_C}{dt} + \frac{1}{RC} i_C = \frac{dv_S}{dt}$$



(a) Circuit at $t = 0$

(b) Same circuit a long time after the switch is closed

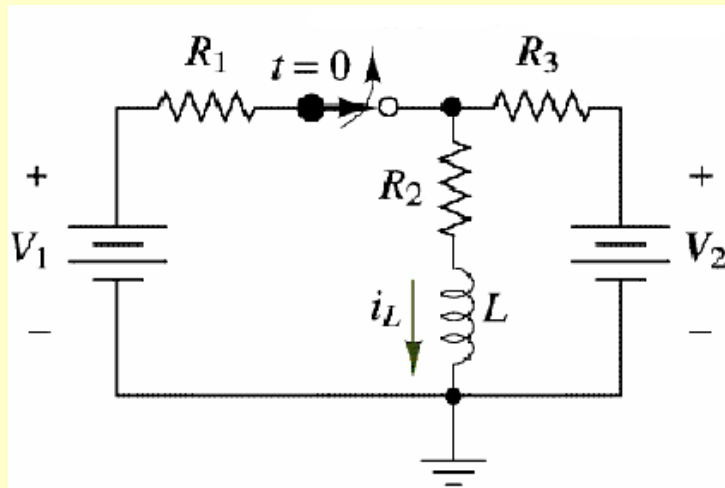


The capacitor acts as open circuit for the steady state condition

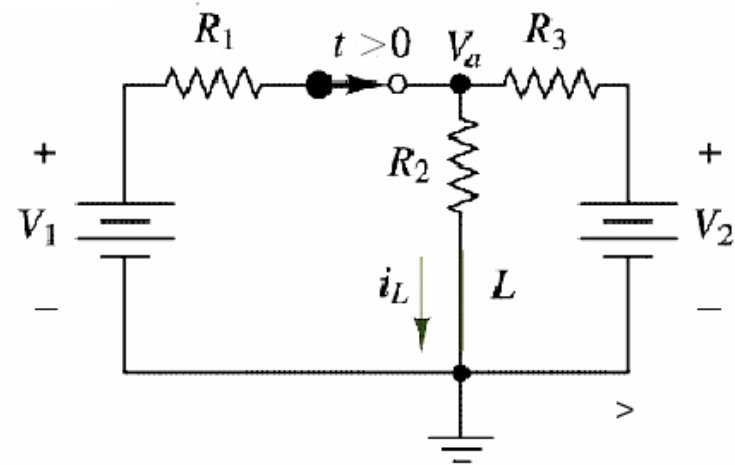
(a long time after the switch is closed).

(a) Circuit for $t = 0$

(b) Same circuit a long time before the switch is opened



(a)



(b)

The inductor acts as short circuit for the steady state condition

(a long time after the switch is closed).