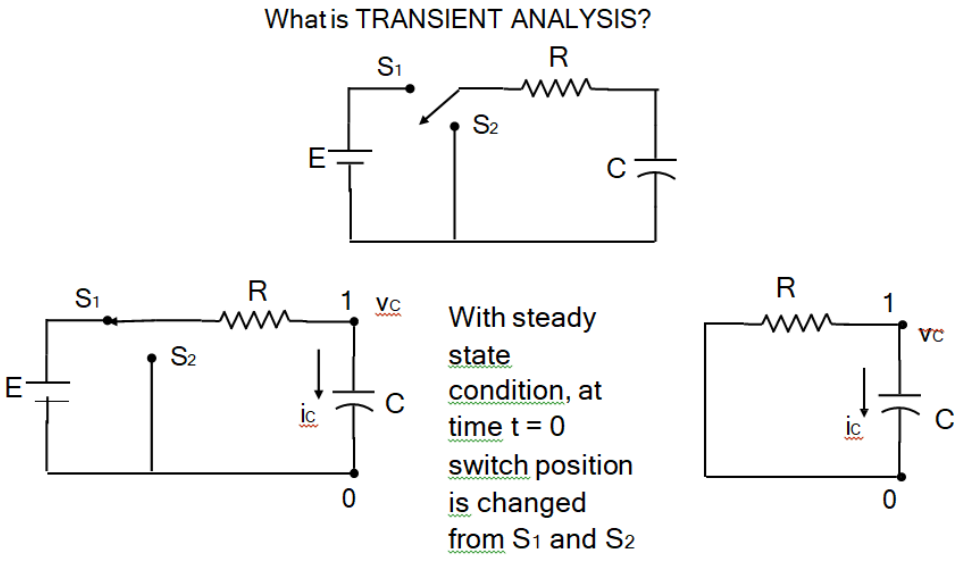
Introduction

Electric circuits will be subjected to sudden changes which may be in the form of opening and closing of switches or sudden changes in sources etc.

Whenever such a change occurs, the circuit which was in a particular steady state condition will go to another steady state condition.

Transient analysis is the analysis of the circuits during the time it changes from one steady state condition to another steady state condition.

Transient analysis will reveal how the currents and voltages are changing during the transient period.



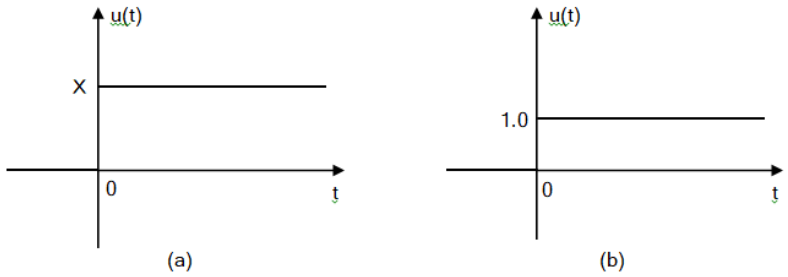
For t ≥ 0, both v_C and i_C change with respect time.

Step function

Step function is denoted as u(t) and is described by

$$u(t) = X \text{ for } t \geq 0$$
$$= 0 \text{ for } t < 0 \qquad (7.2)$$

Fig. (a) shows a step function.



The step function with X = 1 is called as unit step function. It is described as

$$u(t) = 1.0 \text{ for } t \geq 0$$
$$= 0 \text{ for } t < 0 \qquad (7.3)$$

Exponentially decaying function

Exponentially decaying function is described by

$$x(t) = X e^{-\alpha t} \text{ for } t \geq 0$$
$$= 0 \text{ for } t < 0 \qquad (7.4)$$

The value of this function decreases exponentially with time as shown in Fig. below.