Inductor Storage Process (45:25)

Draw the general purpose plot of voltage across an inductor as a function of time for a simple inductor storage process and identify an equation that describes this phenomenon.

Draw the general purpose plot of current through an inductor as a function of time for a simple inductor storage process and identify an equation that describes this phenomenon.

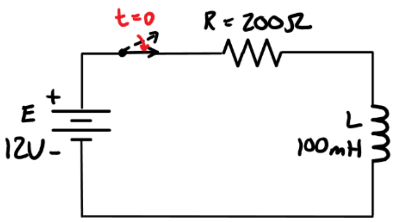
Identify the model used to describe an inductor carrying no current at the beginning of the storage process.

Identify the model used to describe an inductor carry stable, steady state at the end of the storage process.

Identify the formula used to calculate the time constant, τ, for a simple inductor storage circuit.

Compare and contrast the capacitor charge process and the inductor storage process.

Inductor Storage Circuit 1 (7:32 to 16:08)



Determine the time constant for the inductor storage circuit above. Determine the time necessary for a complete storage.

Determine the initial conditions for I_R, V_R, I_L, and V_L for the inductor storage circuit above.

Determine the final conditions for I_R, V_R, I_L, and V_L for the inductor storage circuit above at the end of the storage process.

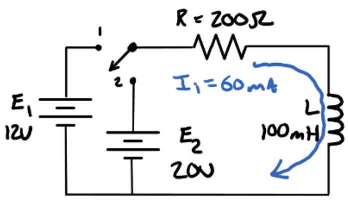
Derive the time variant expressions for $v_L(t)$ and $i_L(t)$ and plot these properties for a complete storage.

Derive the time variant expressions for $v_R(t)$ and $i_R(t)$ and plot these properties for a complete storage.

Determine the instantaneous values for I_R, V_R, I_L, and V_L at t=750µs.

Determine the time I_L has risen to 20mA. At this same time determine the instantaneous values for I_R, V_R, and V_L.

Inductor Storage Circuit 2 (16:08 to 27:57)



Given the switch in position 1 has established 60mA of steady state current through the inductor, model the storage process when the switch moves to position 2.

Determine the time constant for the inductor storage circuit above. Determine the time necessary for a complete storage.

Determine the initial conditions for I_R, V_R, I_L, and V_L for the inductor storage circuit above.

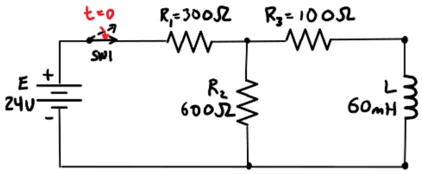
Determine the final conditions for I_R, V_R, I_L, and V_L for the inductor storage circuit above at the end of the storage process.

Derive the time variant expressions for $v_L(t)$ and $i_L(t)$ and plot these properties for a complete storage.

Derive the time variant expressions for $v_R(t)$ and $i_R(t)$ and plot these properties for a complete storage.

Determine the instantaneous values for I_R, V_R, I_L, and V_L for a partial storage event lasting 500µs. Plot electrical properties for a 500µs partial storage.

Inductor Storage Circuit 3 (27:57 to END)



Determine the Thevenin's equivalent circuit seen by the inductor for the inductor storage circuit above.

Determine the time constant for the inductor storage circuit above. Determine the time necessary for a complete storage.

Determine the initial conditions for I_L and V_L for the inductor storage circuit above.

Determine the final conditions for I, and V_L for the inductor storage circuit above at the end of the storage process.

Determine the time I_L has risen to 20mA. At this same time determine the instantaneous values of V_L, I_1, V_1, I_2, V_2, I_3, and V_3.

Determine the steady state values of I_L, V_L, I_1, V_1, I_2, V_2, I_3, and V_3 after a complete storage of longer than 1ms.