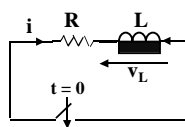


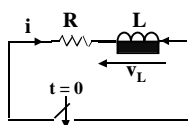
Lezione 26

RL in evoluzione libera



$$i(0) = I_0$$

RL in evoluzione libera



$$i(0) = I_0$$

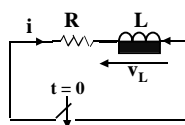
$$v_R + v_L = 0$$

$$v_L = L \frac{di}{dt}$$

$$Ri + L \frac{di}{dt} = 0$$

$$\frac{di}{dt} + \frac{R}{L} i = 0$$

RL in evoluzione libera



$$\frac{di}{dt} + \frac{R}{L} i = 0$$

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

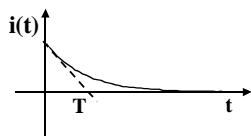
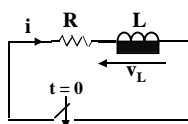
$$i(t) = k e^{-t/T}$$

$$T = L/R$$

$$i(0) = k = I_0$$

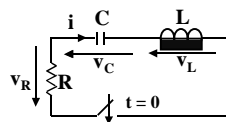
$$i(t) = I_0 e^{-t/T}$$

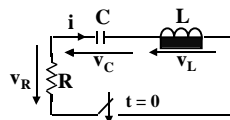
La costante di tempo T



$$i(t) = I_0 e^{-t/T}$$

Il circuito R L C





Il circuito R L C

$$v_R + v_C + v_L = 0$$

$$v_L = L \frac{di}{dt}$$

$$i = C \frac{dv_C}{dt}$$

$$v_R = Ri$$

$$RC \frac{dv_C}{dt} + v_C + LC \frac{d^2 v_C}{dt^2} = 0$$

$$\frac{d^2 v_C}{dt^2} + \frac{R}{L} \frac{dv_C}{dt} + \frac{v_C}{LC} = 0$$

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Equazioni del secondo ordine

$$\frac{d^2 v_C}{dt^2} + \frac{R}{L} \frac{dv_C}{dt} + \frac{v_C}{LC} = 0$$

$$y'' + a_1 y' + a_0 y = 0$$

$$e^{\alpha x}(\alpha^2 + a_1 \alpha + a_0) = 0$$

$$y(x) = k_1 e^{\alpha_1 x} + k_2 e^{\alpha_2 x}$$

$$\alpha_{1,2} = \frac{-a_1 \pm \sqrt{a_1^2 - 4a_0}}{2}$$

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Equazioni del secondo ordine

$$\frac{d^2 v_C}{dt^2} + \frac{R}{L} \frac{dv_C}{dt} + \frac{v_C}{LC} = 0$$

$$y(x) = k_1 e^{\alpha_1 x} + k_2 e^{\alpha_2 x}$$

Integrale generale

$$y'' = -a_1 y' - a_0 y$$

$$\alpha_{1,2} = \frac{-a_1 \pm \sqrt{a_1^2 - 4a_0}}{2}$$

- Reali e distinte
- Reali e coincidenti
- Complesse coniugate

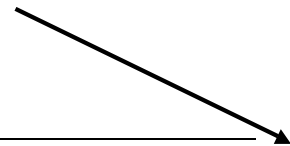
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Radici reali e distinte

$$y(x) = k_1 e^{\alpha_1 x} + k_2 e^{\alpha_2 x}$$

$$v_C(t) = k_1 e^{\alpha_1 t} + k_2 e^{\alpha_2 t}$$



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Riepilogo della Lezione 26

- Serie di R, L e C ;
- Equazioni del secondo ordine;
- Radici reali e distinte;
- Esercizi.

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Fine della
Lezione 26

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