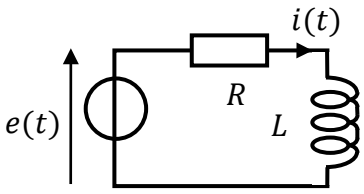
TD 4: Linear networks in sinusoidal steady state

[ECUE : 2526_I_INF_FISE_S01_CN_OAC]

Exercise 1:

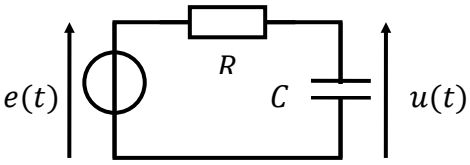


Consider the diagram on the opposite where

$e(t) = E\sqrt{2}\sin(\omega.t)$

Give the expression of the complex amplitude $\underline{I}$ associated to the current $i(t)$.

Exercise 2:

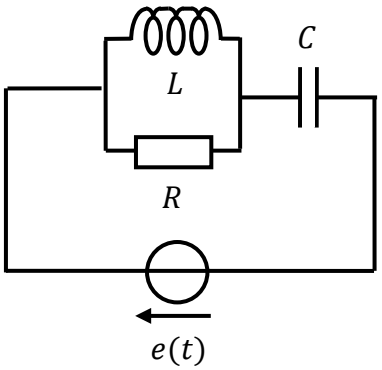


Consider the diagram on the opposite where

$e(t) = E\sqrt{2}\sin(\omega.t)$

Give the expression of the complex amplitude $\underline{U}$ associated to the voltage $u(t)$.

Exercise 3:

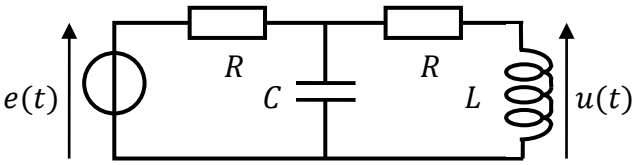


Consider the diagram on the opposite where

$e(t) = E\sqrt{2}.cos(\omega t)$.

Give the expression of the complex amplitude associated to the current in each branch.

Exercise 4:

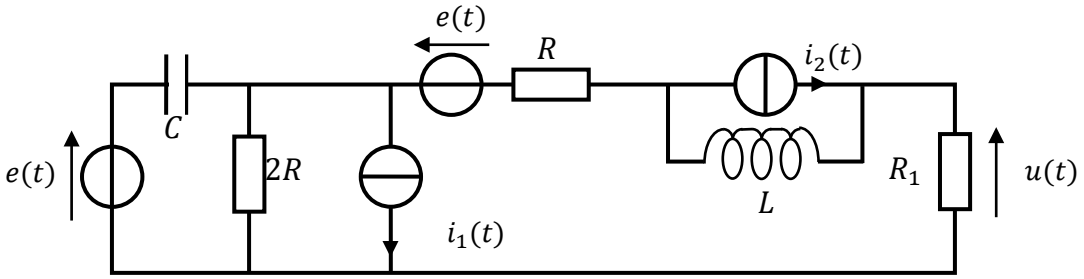


Consider the diagram on the opposite where

$e(t) = E\sqrt{2}\sin(\omega.t)$

Give the expression of the complex amplitude $\underline{U}$ associated to the current $u(t)$.

Exercise 5:



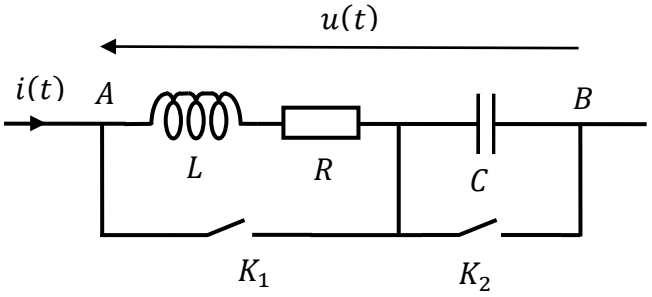
Consider the diagram above where:

$$\begin{cases} i_1(t) = I.\sqrt{2}.cos(\omega t) \\ i_2(t) = I.\sqrt{2}.sin(\omega t) \\ e(t) = E.\sqrt{2}.sin\,(\omega t) \end{cases}$$

I, E, ω, L, R and C are supposed known.

1. Give the expressions of the complex amplitudes associated to $i_1(t)$, $i_2(t)$ and $e(t)$.
2. Give the expressions of the complex amplitude $\underline{U}$ associated to the voltage $u(t)$ between R_1terminals in terms of known parameters.

BONUS:



Consider the diagram above where a given alternative voltage $u(t)$ is set between points A and B. The RMS value of $u(t)$ is U.

We notice that the RMS value of current $i(t)$ flowing between A and B is the same when:

- K_1 et K_2 are open
- Only $K_1$is open
- Only K_2 is open

What are the relations between R, L and C ?