

# Electrical Power Engineering Fundamentals

## AC CIRCUITS (15<sup>th</sup> November 2019)

In the circuit below:

$$u_1(t) = \sqrt{2} \cdot 1,25 \cdot \cos(100t) \text{ V}$$

$$u_2(t) = \sqrt{2} \cdot 10 \cdot \cos(100t) \text{ V}$$

$$i_3(t) = \sqrt{2} \cdot 8 \cdot \cos(100t - 90) \text{ A}$$

$$R1 = 0.25 \Omega; R2 = 1 \Omega, L1 = 2.5 \text{ mH}; L2 = 5 \text{ mH}; C1 = 0.05 \text{ F}; C2 = 0.01 \text{ F}$$

- Write the nodal equations for nodes A, B and C taking D as reference node. Express the equations as a matrix system. Solve the system and calculate the nodal voltages in phasor form
- Calculate the complex power supplied by the voltage source  $u_{g1}$
- Calculate the Thevenin's equivalent of the circuit at terminals C D including all the elements of the circuit in the equivalent. Draw the equivalent
- Calculate the complex power absorbed by an impedance  $Z_{\text{load}}=3+7j$  connected between terminals C D.

