

Electrical Power Engineering Fundamentals

Departamento de Ingeniería Eléctrica. Universidad Carlos III de Madrid

Module 3. Analysis of AC Circuits. Week 6

Exercise 1. In the circuit below, find current $i(t)$ using Thevenin's Theorem:

$$U_{g1}(t) = 2\sqrt{2}\cos(2t) \text{ V}$$

$$I_{g2}(t) = 2\sin(2t + 45^\circ) \text{ A}$$

$$U_{g3}(t) = 3\sqrt{2}\sin(2t) \text{ V}$$

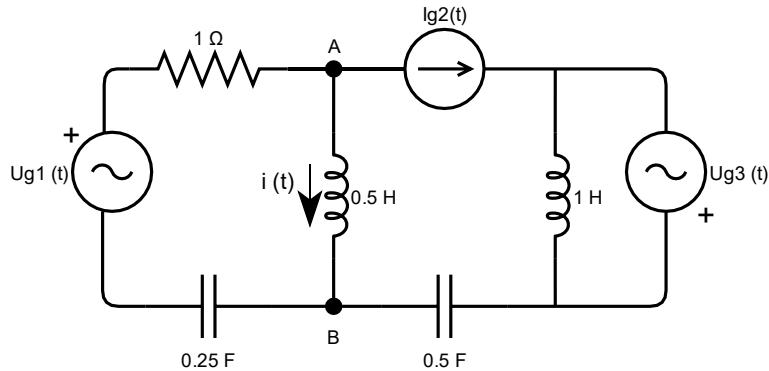


Figure 1 AC circuit 1

Exercise 2. In the circuit below, find the power generated by sources and check the power balance:

$$U_g(t) = 5\sqrt{2}\sin(2t) \text{ V}$$

$$I_{g1}(t) = 20\sin(2t - 45^\circ) \text{ A}$$

$$I_{g2}(t) = 2\sqrt{2}\cos(2t) \text{ A}$$

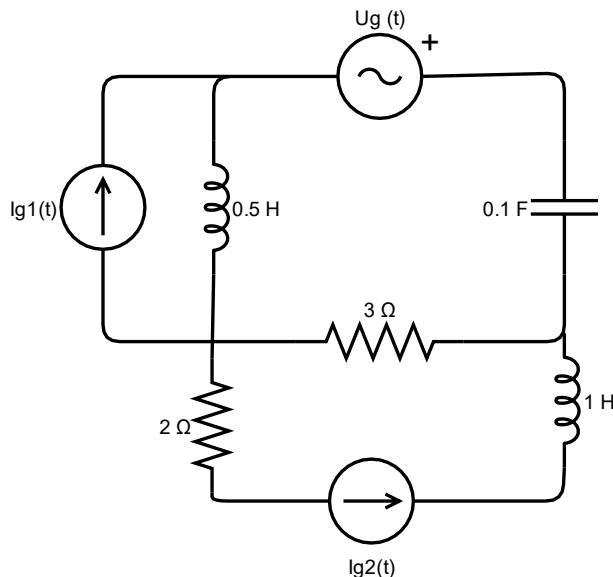


Figure 2 AC circuit 2

Exercise 3. In the following circuit, find $i(t)$ and check the power balance:

$$U_{g1}(t) = 5\sqrt{2}\sin(0.5t) \text{ V}$$

$$U_{g2}(t) = 2\sqrt{2}\cos(0.5t) \text{ V}$$

$$U_{g3}(t) = \sqrt{2}\sin(0.5t - 90^\circ) \text{ V}$$

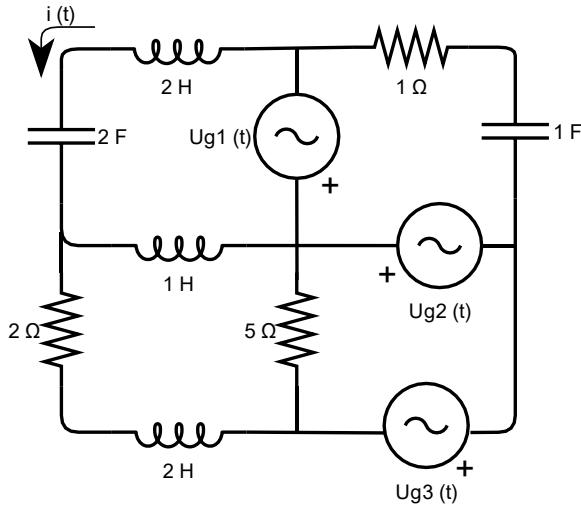


Figure 3. AC circuit 3

Exercise 4. Find the Thévenin equivalent between nodes A and B for the following circuit.

$$U_g(t) = \sqrt{2}\sin(2t + 180^\circ) \text{ V}$$

$$I_g(t) = \sqrt{2}\cos(2t) \text{ A}$$

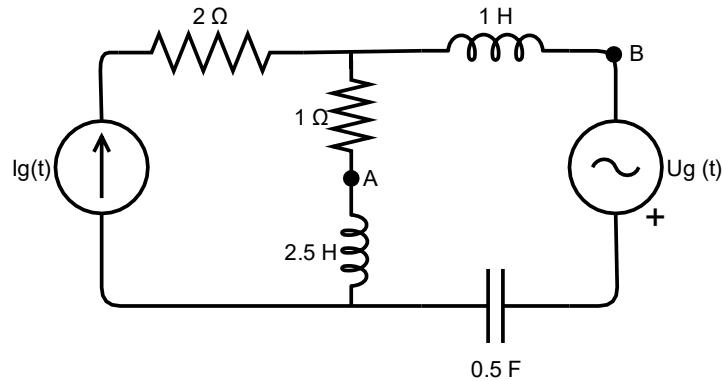


Figure 4. AC circuit 4