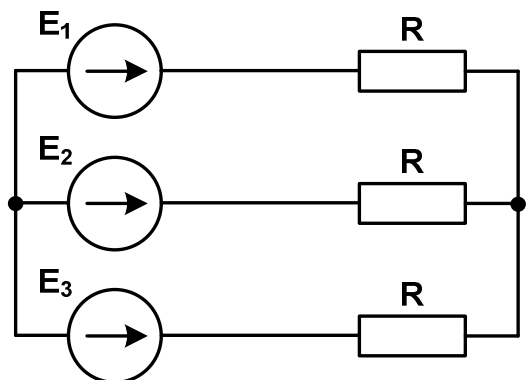


Module name: **Electrical Circuits 2**
Module ID: **IS-FEE-10085S**
Module type: **Workshop**
Semester: **summer 2023/2024**
Instructor: **Jarosław Forenc**, j.forenc@pb.edu.pl

Workshop 4 (30.04.2024)

1. The electric circuit shows a 3-phase, balanced Y-Y system with a resistive load. Simulate the circuit using PSpice. Observe the waveforms of phase and line-to-line voltages across the generator/load, as well as the phase currents. Assume: frequency $f = 50$ Hz, resistance of the load $R = 100 \Omega$. Choose the remaining circuit parameters yourself.

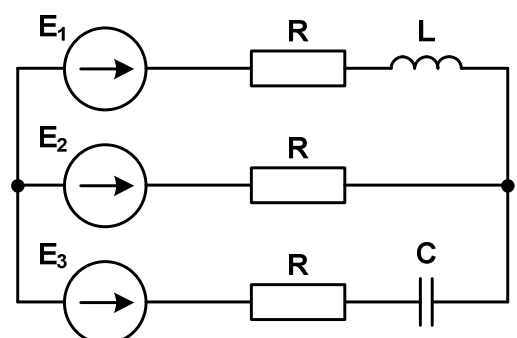


The report should include:

- values of the element used and the electrical circuit diagram (from PSpice),
- waveforms of phase and line-to-line voltages of the generator (for one period),
- voltage and current waveforms of the load (for one period),
- conclusions (do the analyses of the obtained waveforms confirm the theoretical relationships between currents and voltages?)

Note: copying waveforms: *Window* → *Copy to Clipboard* (ensure the „change white to black” option is selected)

2. The electric circuit shows a 3-phase, unbalanced Y-Y system. Simulate the circuit using PSpice. Consider two cases: a) without a neutral wire, b) with a neutral wire. Observe the waveforms of voltages and currents. Assume: frequency $f = 50$ Hz, $R = 100 \Omega$, $L = 200$ mH, $C = 25 \mu\text{F}$. Choose the remaining circuit parameters yourself.



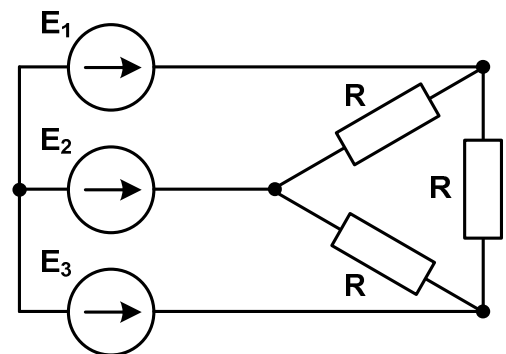
The report should include (without a neutral wire):

- values of the element used and the electrical circuit diagrams (from PSpice),
- waveforms of phase and line-to-line voltages of the generator (for one period),
- waveforms of phase voltages of the load and voltage between neutral points (for one period),
- voltage and current waveforms of the load (for one period),
- conclusions (do the analyses of the obtained waveforms confirm the theoretical relationships between currents and voltages?)

The report should include (with a neutral wire):

- values of the element used, electrical circuit diagrams (from PSpice),
- waveforms of phase and line-to-line voltages of the generator (for one period),
- waveforms of phase voltages of the load (for one period),
- voltage and current waveforms of the load and current in neutral wire (for one period),
- conclusions (do the analyses of the obtained waveforms confirm the theoretical relationships between currents and voltages?)

3. The electric circuit shows a 3-phase, balanced Y- Δ system with a resistive load. Simulate the circuit using PSpice. Observe the waveforms of phase and line-to-line voltages across the generator/load, as well as the phase and line currents. Assume: frequency $f = 50$ Hz, resistance of the load $R = 100 \Omega$. Choose the remaining circuit parameters yourself.



The report should include:

- values of the element used and the electrical circuit diagram (from PSpice),
- waveforms of phase and line-to-line voltages of the generator (for one period),
- waveforms of line currents and phase currents of the load (for one period),
- voltage and current waveforms of the load (for one period),
- conclusions (do the analyses of the obtained waveforms confirm the theoretical relationships between currents and voltages?)