Alternating current task:

The AC circuit consists of a resistor $2R$, an ideal inductor with inductive reactance $\omega L = 3R$ and a capacitor with capacitive reactance $(1/\omega C) = 5R$ where R is some unit resistance. The resistor and capacitor are connected in parallel, the inductor is connected serial with both of them. So the complex impedance of the circuit can be expressed by the formula

$$\tilde{Z} = \frac{2R}{1 + j\omega C\,2R} + j\omega L$$

where j is the imaginary unit. The AC network voltage U is applied to this circuit. Please calculate the voltages across all the components (in units U) and currents flowing through all the branches of the circuit (in units U/R). Find the phase angle between the current and voltage. Find the power consumed by the resistor (in units U^2/R) and draw the phasor diagram of the circuit.

Alternating current task:

The AC circuit consists of a resistor $3R$, an ideal inductor with inductive reactance $\omega L = 2R$ and a capacitor with capacitive reactance $(1/\omega C) = 4R$ where R is some unit resistance. The resistor and inductor are connected in series, the capacitor is connected parallel with both of them. So the complex impedance of the circuit can be expressed by the formula

$$\tilde{Z} = \frac{1}{\frac{1}{3R + j\omega L} + j\omega C}$$

where j is the imaginary unit. The AC network voltage U is applied to this circuit. Please calculate the voltages across all the components (in units U) and currents flowing through all the branches of the circuit (in units U/R). Find the phase angle between the current and voltage. Find the power consumed by the resistor (in units U^2/R) and draw the phasor diagram of the circuit.

Alternating current task:

The AC circuit consists of a resistor $2R$, an ideal inductor with inductive reactance $\omega L = 3R$ and a capacitor with capacitive reactance $(1/\omega C) = 4R$ where R is some unit resistance. The resistor and inductor are connected in parallel, the capacitor is connected serial with both of them. So the complex impedance of the circuit can be expressed by the formula

$$\tilde{Z} = \frac{1}{\frac{1}{2R} - j\frac{1}{\omega L}} + \frac{1}{j\omega C}$$

where j is the imaginary unit. The AC network voltage U is applied to this circuit. Please calculate the voltages across all the components (in units U) and currents flowing through all the branches of the circuit (in units U/R). Find the phase angle between the current and voltage. Find the power consumed by the resistor (in units U^2/R) and draw the phasor diagram of the circuit.

Alternating current task:

The AC circuit consists of a resistor 4*R*, an ideal inductor with inductive reactance $\omega L = 3R$ and a capacitor with capacitive reactance $(1/\omega C) = 2R$ where R is some unit resistance. The resistor and inductor are connected in series, the capacitor is connected parallel with both of them. So the complex impedance of the circuit can be expressed by the formula

$$\tilde{Z} = \frac{1}{\dfrac{\omega C}{\omega C 4R - j} - j\dfrac{1}{\omega L}}$$

where j is the imaginary unit. The AC network voltage *U* is applied to this circuit. Please calculate the voltages across all the components (in units *U*) and currents flowing through all the branches of the circuit (in units *U/R*). Find the phase angle between the current and voltage. Find the power consumed by the resistor (in units U^2/R) and draw the phasor diagram of the circuit.