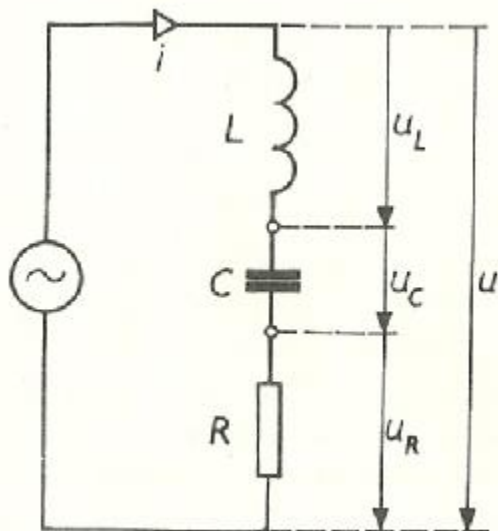


## 3.3 Composed circuit (RLC circuit)

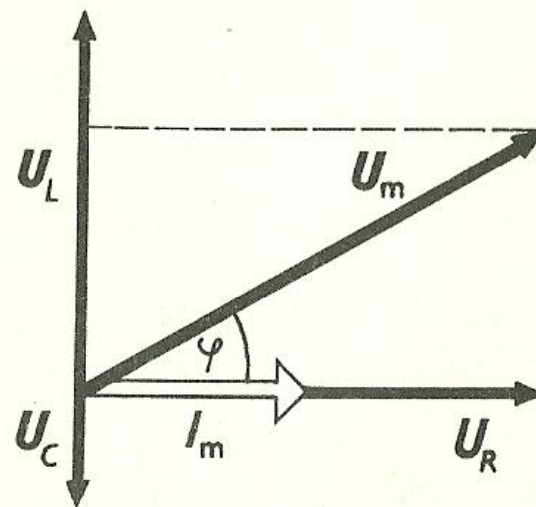
5-6

Obvod s  $RLC$  v sérii



5-7

Fázorový diagram v obvodu s  $RLC$  v sérii



$$U_m^2 = U_R^2 + (U_L + U_C)^2 = I_m^2 (R^2 + (\omega L - 1/\omega C)^2)$$

$$\text{Impedance: } Z = U_m / I_m = \sqrt{R^2 + (\omega L - 1/\omega C)^2} = \sqrt{R^2 + X^2}$$

$$\text{Reactance: } X = X_L + X_C$$

If  $\omega L = 1/\omega C$  – resonance

$$\omega^2 = 1 / LC$$

$$f_0 = 1 / 2\pi \sqrt{LC}$$

- There is frequency  $f = 50\text{Hz}$  in a circuit and then  $X_L = 2 X_C$ . How must be the frequency changed to have a resonance in the circuit?

- In an AC circuit there are in series resistance of  $600\Omega$ , coil with inductance of  $0.4\text{ H}$  and capacitor with capacity of  $0.1\ \mu\text{F}$ . Calculate impedance of the circuit ( $Z$ ) at a frequency  $f = 400\text{ Hz}$ .