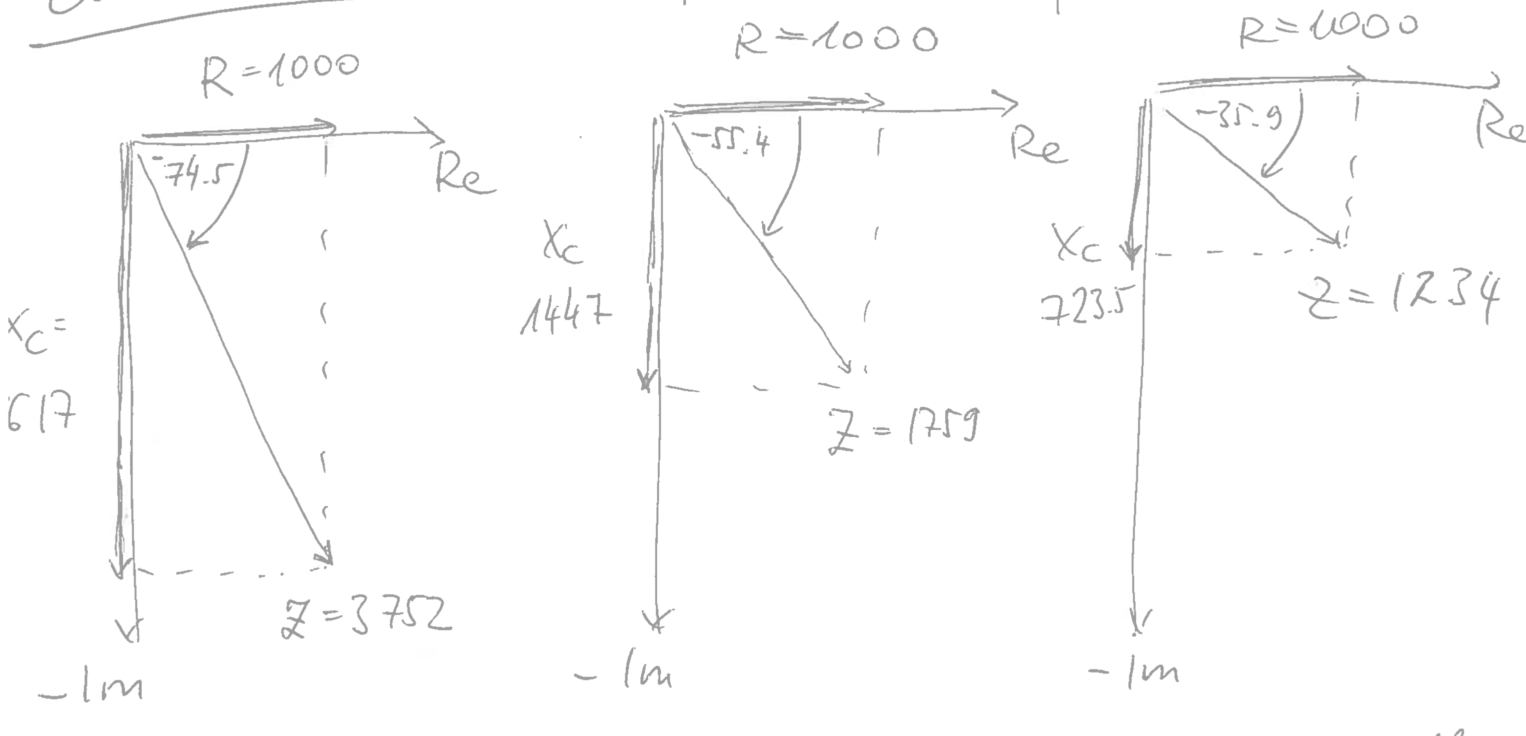
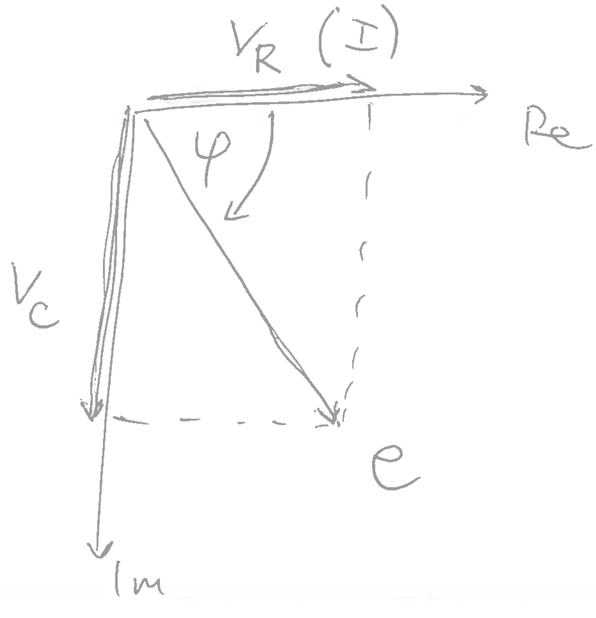
f	X_c	R	$V_r = 5 \cdot \frac{R}{\lvert Z \rvert}$	$V_c = 5 \cdot \frac{X_c}{\lvert Z \rvert}$	φ
200 Hz	3617 Ω	1000 Ω	1.33 V	4.82 V	−74.5°
500 Hz	1447 Ω	1000 Ω	2.84 V	4.11 V	−55.4°
1000 Hz	723.5 Ω	1000 Ω	4.05 V	2.93 V	−35.9°

Circuit 1.



200 Hz | 500 Hz | 1000 Hz

measurement:



Circuit 2

In theory, the resonance frequency is approx. 500 Hz for the given values, but I got maximal V_r @ 475 Hz.

Due to the internal resistance ~70Ω of L, the maximum of V_r is:

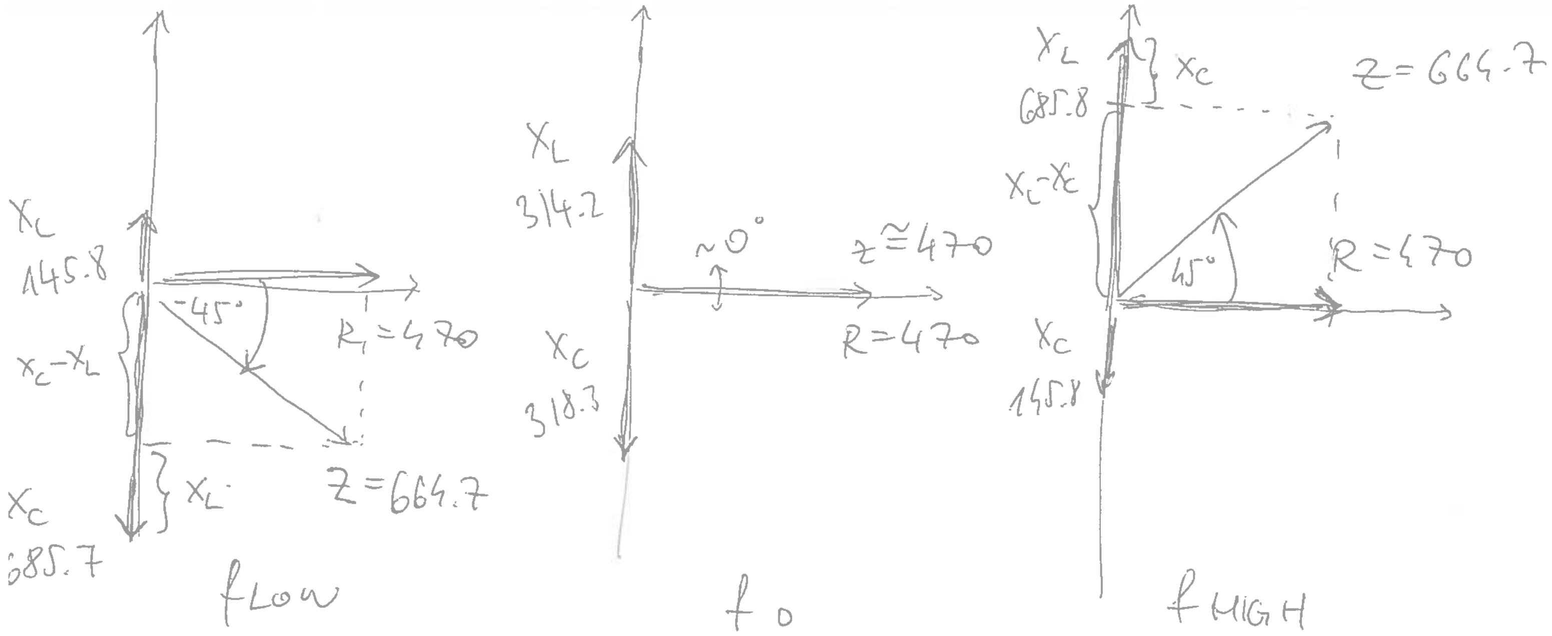
$$(V_r)_{max} = 5 \cdot \frac{470}{470+70} \approx 4.35\,V$$

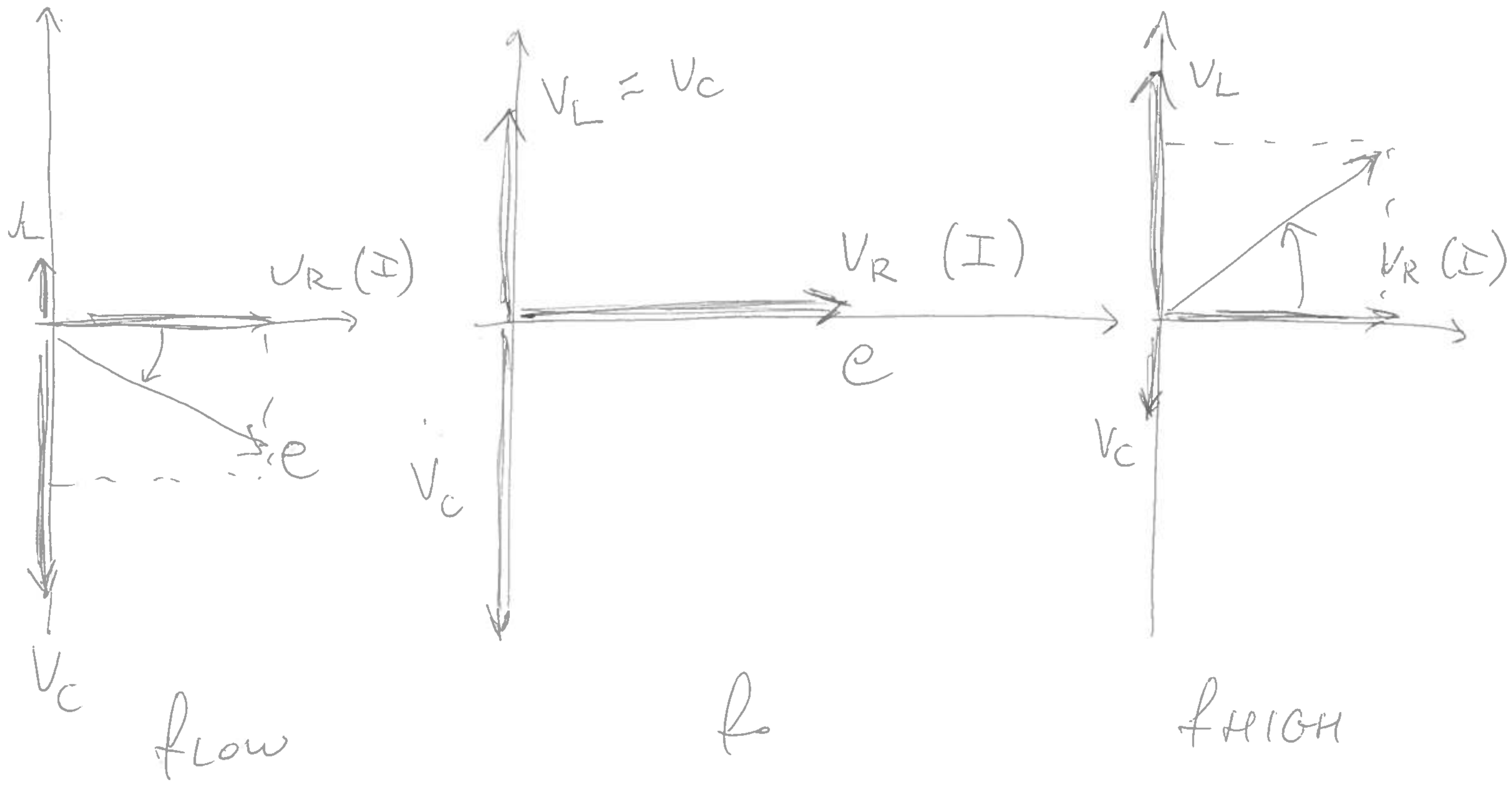
Similarly the ω_{LOW} and ω_{HIGH} values are also affected by $R_{internal}$.

$$\omega_{1,2} = \frac{\sqrt{R^2 + \frac{4L}{C}} \pm R}{2L} \quad \begin{cases} \sim 232.1\,Hz,\ 1458\,\frac{rad}{s} \\ \sim 1091.5\,Hz,\ 6858\,\frac{rad}{s} \end{cases}$$

But $\omega_{LOW} \cdot \omega_{HIGH} \equiv \omega_{res}^2$ should be true.

frequency [Hz]	e_{RMS} [V]	$V_{r\,RMS}$ [V]	$V_{L\,RMS}$ [V]	$V_{C\,RMS}$ [V]	R [Ω]	X_L [Ω]	X_C [Ω]	φ
232.1	5	3.05	0.955 1.06	4.49	470	145.8	685.7	−45°
500	5	4.35	2.91 2.98	2.95	470	314.2	318.3	~0°
1091.5	5	3.05	4.49 4.51	0.95	470	685.8	145.8	+45°





Due to $R_{INTERNAL}$, the angles here are 45° – 55° instead of 45°.

and $(V_L - V_C)^2 + V_R^2 \neq e$