Recap #1
Frequency dependency of impedances

Problem 1:

Consider the electronic circuit shown in Fig. 1.

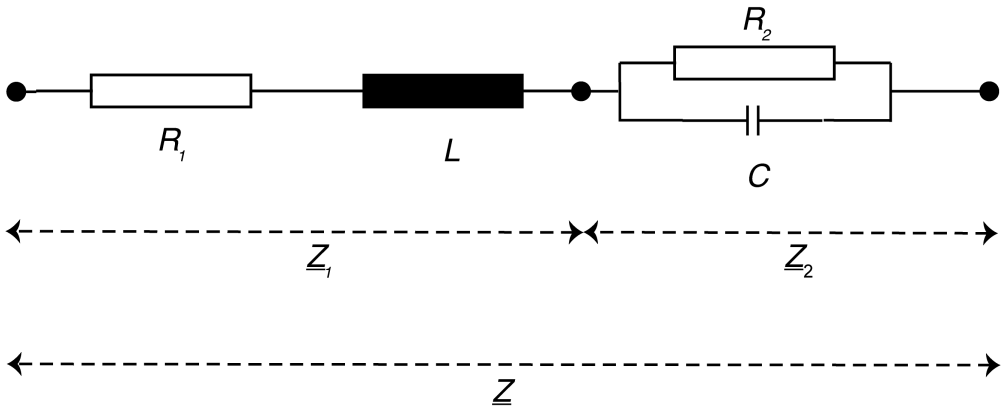

Figure 1: Electronic circuit to be considered.

with the following parameters: $L = 6.5$ mH, $C = 12\ \mu$F, $R_1 = 10\ \Omega$ and $R_2 = 33\ \Omega$.

a) Draw the possible values of the total impedance $\underline{Z}$ for all frequencies $\omega = 2\pi \times f$ in the complex plane.
Hint: Start by considering the admittance $\underline{Y}_2 = \frac{1}{\underline{Z}_2}$ *first.*

b) For which values of f has the circuit an inductive, resistive or capacitive character?

Further reading: The math lovers among you can check out the optional section 4.6 in the written lecture notes describing tricks on how to map from the impedance plane to the admittance plane and vice-versa using conformal mapping through $f(\underline{z}) = \frac{1}{\underline{z}}$.