**Experimental study of filters by means of Bode plots**

During this lab we will investigate how filters work by means of taking the Bodeplot.

We will only look at passive filters thus only using (R,C and L). No active elements like OPAMPS will be used during this lab.

Some important feature off filters are:

**Cutoff frequency**: is the frequency beyond which the filter will not pass signals. It is usually measured at a specific attenuation such as 3 dB.

**Roll-off**: is the rate at which attenuation increases beyond the cut-off frequency.

**Transition band**:the (usually narrow) band of frequencies between a passband and stopband.

**Ripple**: is the variation of the filter's insertion loss in the passband.

**The order of a filter** :is the degree of the approximating polynomial and in passive filters corresponds to the number of elements required to build it. Increasing order increases roll-off and brings the filter closer to the ideal response.

*First order sytems*

RC an RL circuits. What type of filters are this?(High pass, notch…)

Take a resistance of 100Ω,1kΩ and 10kΩ branch a capacitor in series. Use once again three different values for C. Calculate the cut off frequency. Measure the module (amplitude) and phase shift by means of an oscilloscope for three points below and four points above the cut off frequency. Draw the Bode plot.

Do the same for an RL series circuit.

*Second order systems*

Do the same but now for a RLC series circuit.