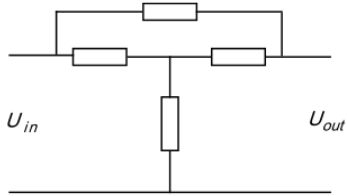
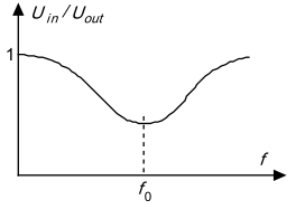
Problem 3

An electronic frequency filter consists of four components coupled as in the upper figure. The impedance of the source can be neglected and the impedance of the load can be taken as infinite. The filter should be such that the voltage ratio U_{out}/U_{in} has a frequency dependence shown in the lower where U_{in} is the input voltage and U_{out} is the output voltage. At frequency f_0 the phase lag between the two voltages is zero.



In order to build the filter you can choose from the following components:

2 resistors, 10 kΩ
2 capacitors, 10 nF
2 solenoids, 160 mH (iron-free and with neglible resistance)



Construct, by combining four of these components, a filter that fulfils the stated conditions. Determine the frequency f_0 and the ratio U_{out}/U_{in} at this frequency for as many component combinations as possible.