Extra Credit A – Chebyshev Filter

You can receive extra credit during the 2nd quarter of the semester by building a simple filter called a Chebyshev filter. If you would like to learn more about designing Chebyshev and Butterworth filters, go to the following website: http://www-users.cs.york.ac.uk/~fisher/lcfilter/.

The circuit below is a 9th order Chebyshev-type filter. It has nine components (five inductors and four capacitors). If we choose these components fairly arbitrarily, we get a filter with several resonances (four peaks and four valleys), as shown in the AC sweep. [In this filter, R1 is internal impedance of the function generator, L1=L2=L3=L4=L5=1mH, C1=C2=C3=C4=0.1uF, and R2=50 ohms.]

Build the circuit. Demonstrate to the staff member that it has four peaks and four valleys at roughly the same frequencies shown on the PSpice AC sweep above. (1) Manually change the function generator frequency and display the input and output voltages with the Analog Discovery scope. (2) Generate a plot similar to the one above using the Network Analyzer. Label and comment on any significant differences between the two plots.

Name of student: _______________________________________________________

Section ___________ Group ___________

Apply Towards (circle one): quiz1  exp1  exp2  exp3

Protoboard returned _______________

Staff Signature ____________________________________________