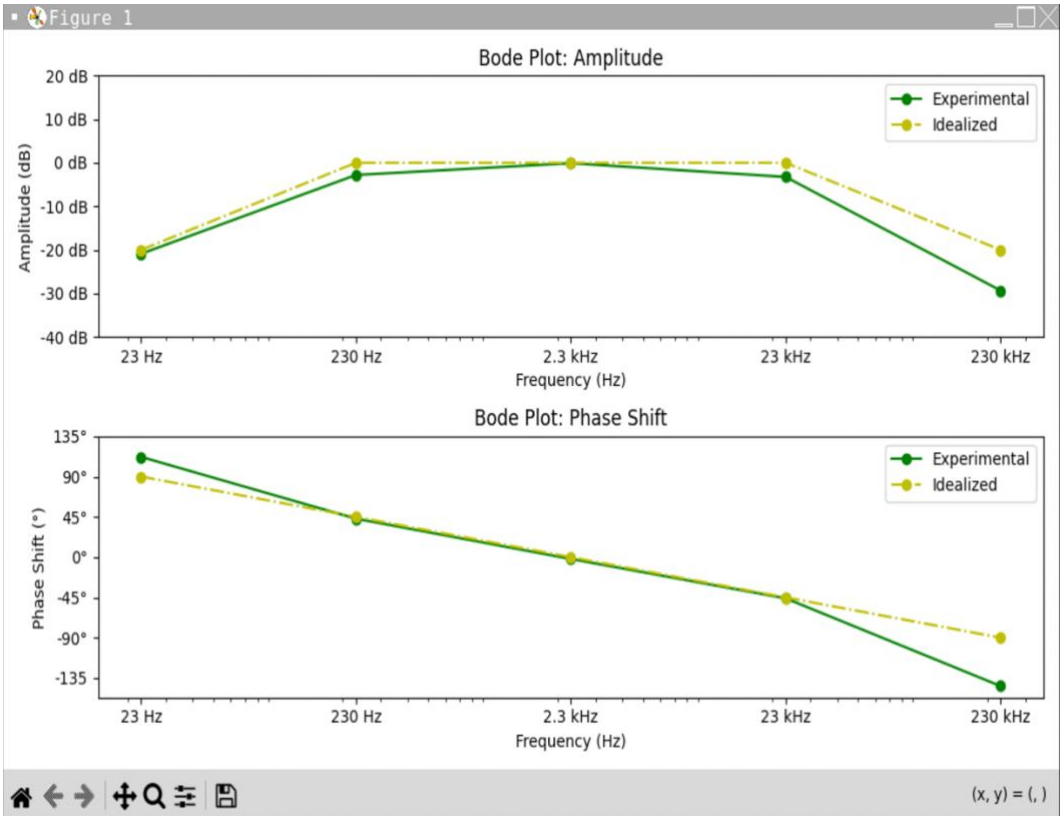
Post-Lab Analysis – Ryan Murphy

You made several frequency and phase shift measurements in the lab today. For your analysis, you're going to plot this data, producing the Bode plots for your active band-pass circuit. The attenuation plots should be log-log, with the amplitude reported in $d\beta$ (measure in $d\beta$ with respect to the original V_{in}). The phase shift plot should be semilog, where the x-axis is logarithmic, and the y-axis is just plain old degrees.

With each of the Bode plots of the experimental data, overlay each one with an idealized Bode plot (the one with sharp corners). The idealized Bode plots were covered both in lecture and in the background to this lab. Plot the real and idealized amplitude *on the same graph* and plot the real and idealized phase on the same graph. In other words, you should turn in two graphs: One with the amplitude plots and one with the phase plots. Each graph is worth 3 points.

Vin	Vout	dB	Hz	Phase
1	0.09005	-20.486769	23	112°
1	0.72413	-3.023906	230	43°
1	0.992	-0.0697666	2300	-2°
1	0.68764	-3.196623	23000	-46°
1	0.03416	-27.744323	230000	-220°



Finally, explain why the experimental data does not match the idealized plots at the sharp corners, and at 220kHz.

Experimental data often deviates from idealized plots at sharp corners and specific frequencies, such as 220kHz, due to several factors. At sharp corners, discrepancies arise because real-world components exhibit non-ideal behavior, including parasitic inductances and capacitances, which cause rounding of the corners in the response. Additionally, at higher frequencies like 220kHz, components such as resistors, capacitors, and inductors have frequency-dependent characteristics that deviate from their idealized models. These effects include parasitic elements, skin effect in conductors, and dielectric losses in capacitors, leading to deviations from the expected ideal response. Furthermore, the experimental setup may introduce noise, signal attenuation, and other imperfections, contributing to the observed differences between the experimental data and the idealized plots.