

Appendix E Graph Figures Gone Bad

This appendix for the Engineering Lab Reports Manual is intended to address common errors seen in graph figures in student papers. Examples are shown of the original figures (and titles) from student papers, and then comments will be made on what is wrong. In a sense, this is intended to do for these graphs what the “Sentences Gone Bad” appendix does for simple English usage. However, in most cases the original data or image in a form that could be easily modified is not available. So, in some cases it is not practical to show a “fixed” version of the figure, and in other cases the “fix” has been made as superimposed material, where ideally one would be better off modifying the original artwork.

Figures fall into several different categories. At this time, the figures included here are either graphs. Schematics will be dealt with in a separate appendix. At this time, the example figures have been drawn from student work in EE252. A more varied selection of examples will be sought in the future.

Example 1 Frequency response graph for an amplifier

Original graph (same size as original):

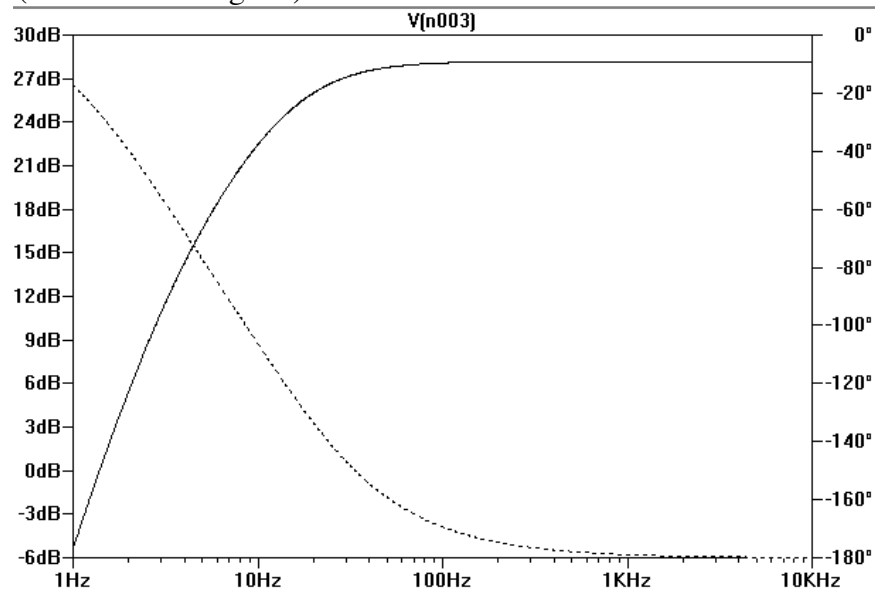


Figure 1: Bode Plot for original bias point

The original graph was a cut and paste out of a circuit simulator program (LTSpice) with no effort to make it more readable or understandable for the report reader. The problems include:

1. No label shown on either axis. The horizontal axis should be Frequency, and the Vertical axes “Response” (or $|A(f)|$ or something equivalent) and “Phase Response”. The axis labels already include the units, so you don’t need “Frequency (Hz)”.
2. The print is a bit small. (I’ve seen much smaller!) If the reader needs a magnifying glass to read anything, it is too small. Here the type is on the borderline of acceptability. (Hint: If you want the printing to be larger, you have to either choose axis options in the

image source program to make it so, or make the window being copied smaller so that the type size is, in comparison, larger.)

3. There are no grid lines. One needs a ruler and a pencil to scribe vertical or horizontal lines to get any sort of quantitative information from the graph. The reader should not have to do that! If there are particular point or values of interest, annotate the graph to show them! (Horizontal grid lines need to be done cleverly to avoid confusion when plotting two quantities that do not use the same scale, as is the case here.)
4. There is a thin grey line across the top of the figure. This is an artifact from the copy and paste process. It should not be there.
5. The identification “V[n003]” is meaningless. In the original simulation, this indicated the node at which the measurement was made. That function, if needed, should be in the title.
6. This is a bit of a quibble, but the phase angle for a system with “poles” and “zeros” tends to jump in units of 90 degrees. Annotating the phase with major grid lines of 90 degrees, and showing numbers for at least 0, 90, 180, and 270 degrees (or negatives of those) would be helpful.

This figure was modified by copying it into a graphics “draw” program, and adding grid lines, blocking out the artifacts, and adding labels and annotations. It is also enlarged so that the numbers are more easily read.

As Modified:

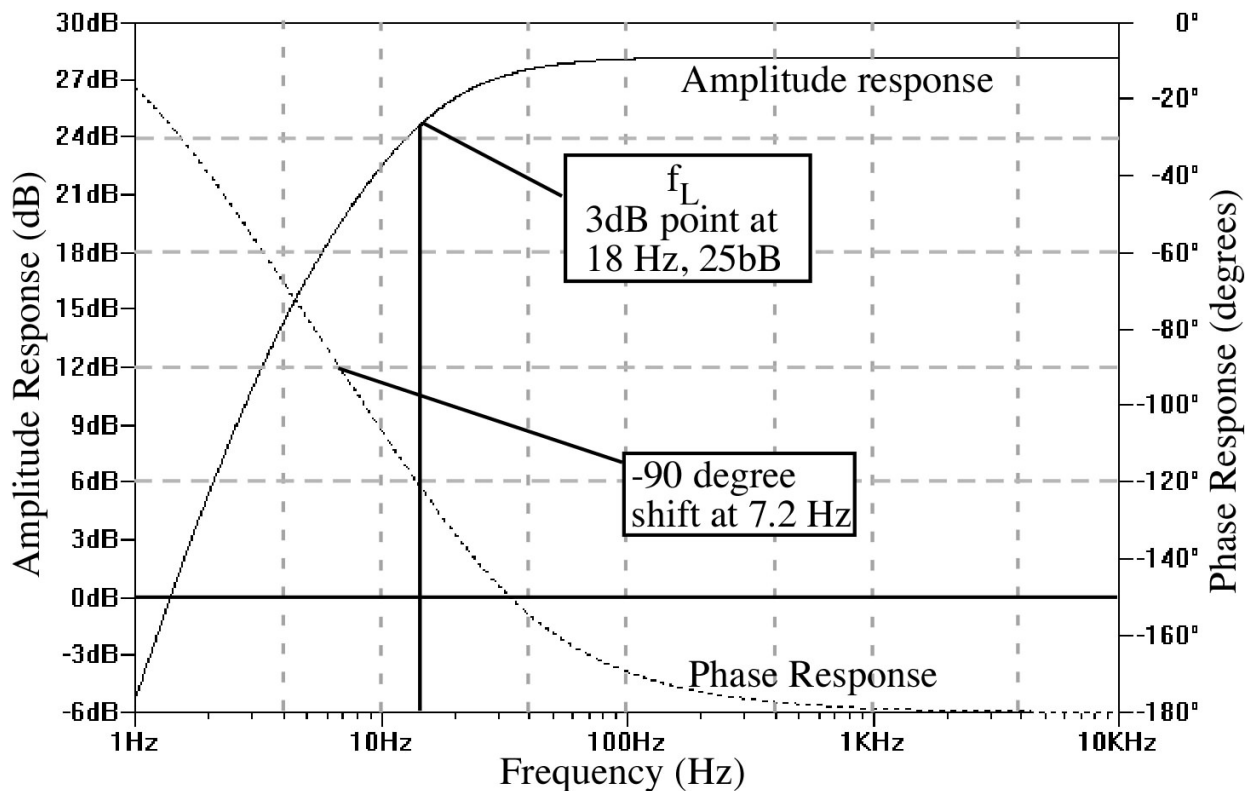


Figure 2: Bode Plot for original bias point