Demo 4 Exercises
Matlab GUI (Graphical User Interface)

DSP Lab (ECE 4163 / ECE 6183)

2023

This lab assignment corresponds to the demo programs:

`filter_cat.m`
`filter_gui_example_ver1.m`
`filter_gui_example_ver2.m`
`filter_app_ver1.m`

The program `filter_app_ver1.m` uses the Matlab `uifigure` to create the GUI which has some advantages. The `uifigure` allows for the components (plots and controls) to be placed in the figure window using the `uigridlayout` function, and the sliders are improved.

Exercises

1. Modify the Matlab demo program `filter_cat.m` to use different filters.

   (a) A higher-order Butterworth band-pass filter.

   (b) A Chebyshev Type II band-pass filter (use `cheby2` instead of `butter` in Matlab to design the filter coefficients).

   (c) An elliptic band-pass filter (use `ellip` in Matlab to design the filter coefficients).

   (d) A Butterworth band-stop filter (instead of a band-pass filter).

   Produce plots showing the filters and the input and output signals, as in the demo file. Comment on your observations.

2. Write a Matlab Graphical User Interface (GUI) that builds upon the provided example. The provided example allows the user to control the cut-off frequency of a low-pass filter using a slider. In addition, the GUI could display the the frequency response (magnitude) of the filter, or the impulse response of the filter (or both), which update as the user adjusts the slider. In addition to submitting your Matlab program (as a .m file), also submit two screenshots of your GUI in use. SUBMIT