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Assignment 6
8/24/2020

Assignment 6

- Problem 1:
  - Part a:

For this problem we were given formulas for the filter transfer function H(w) and Z(w) as well as W(w). The first section asks for the student to play the magnitude and phase response of H(w) in a set range In order to do this we can simply plug in the variables for the formula and make a 4-1 subplot(spectrum is .8 and .9)

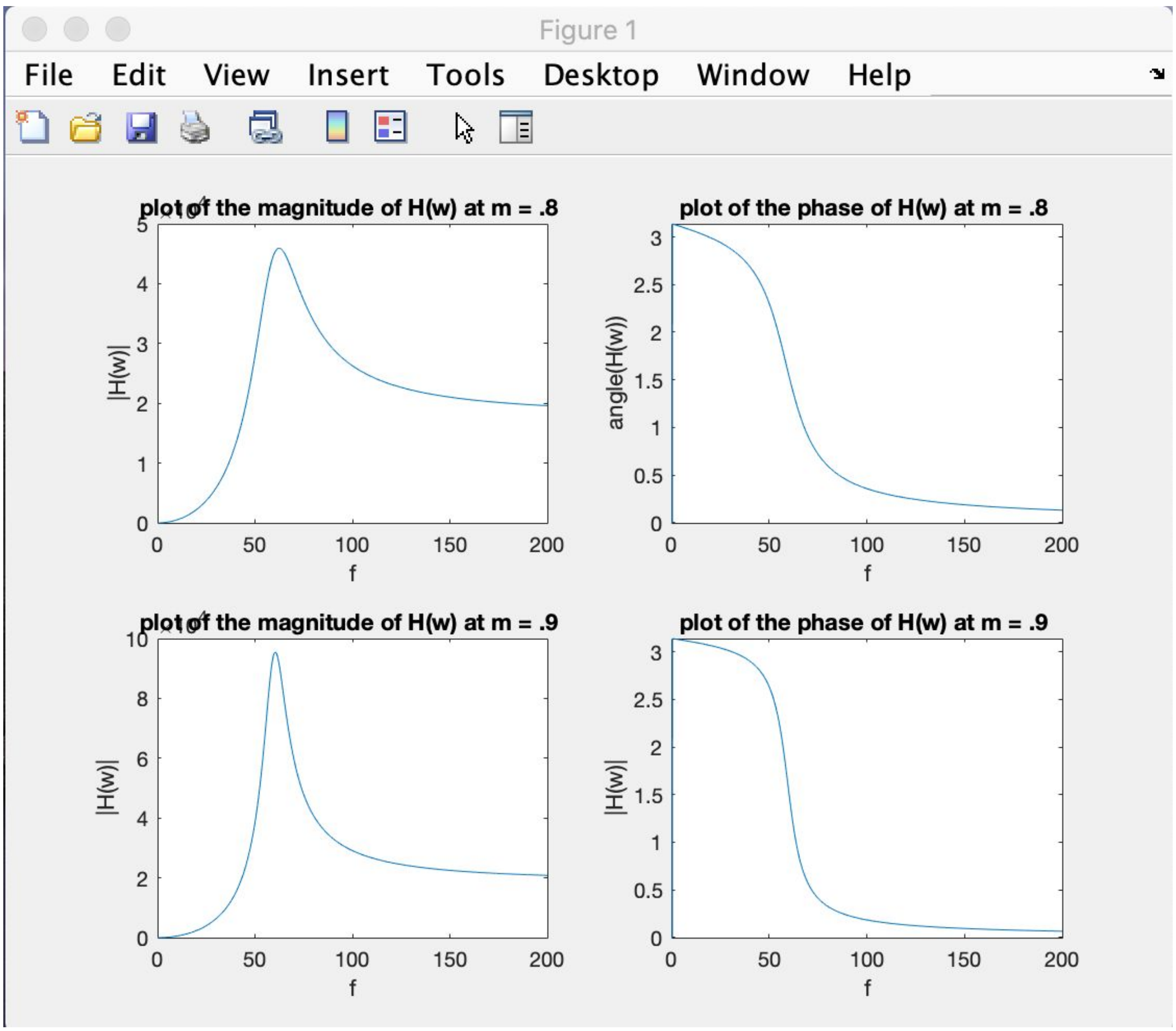

*Figure 1 above is the phase and magnitude plots of H(w) for the expected spectrums

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Part b:

For this part of the problem we were given x(t) and were required to load in a given signal and use it for x(t) and find X(f), Z(f), and Z(t) as seen below:

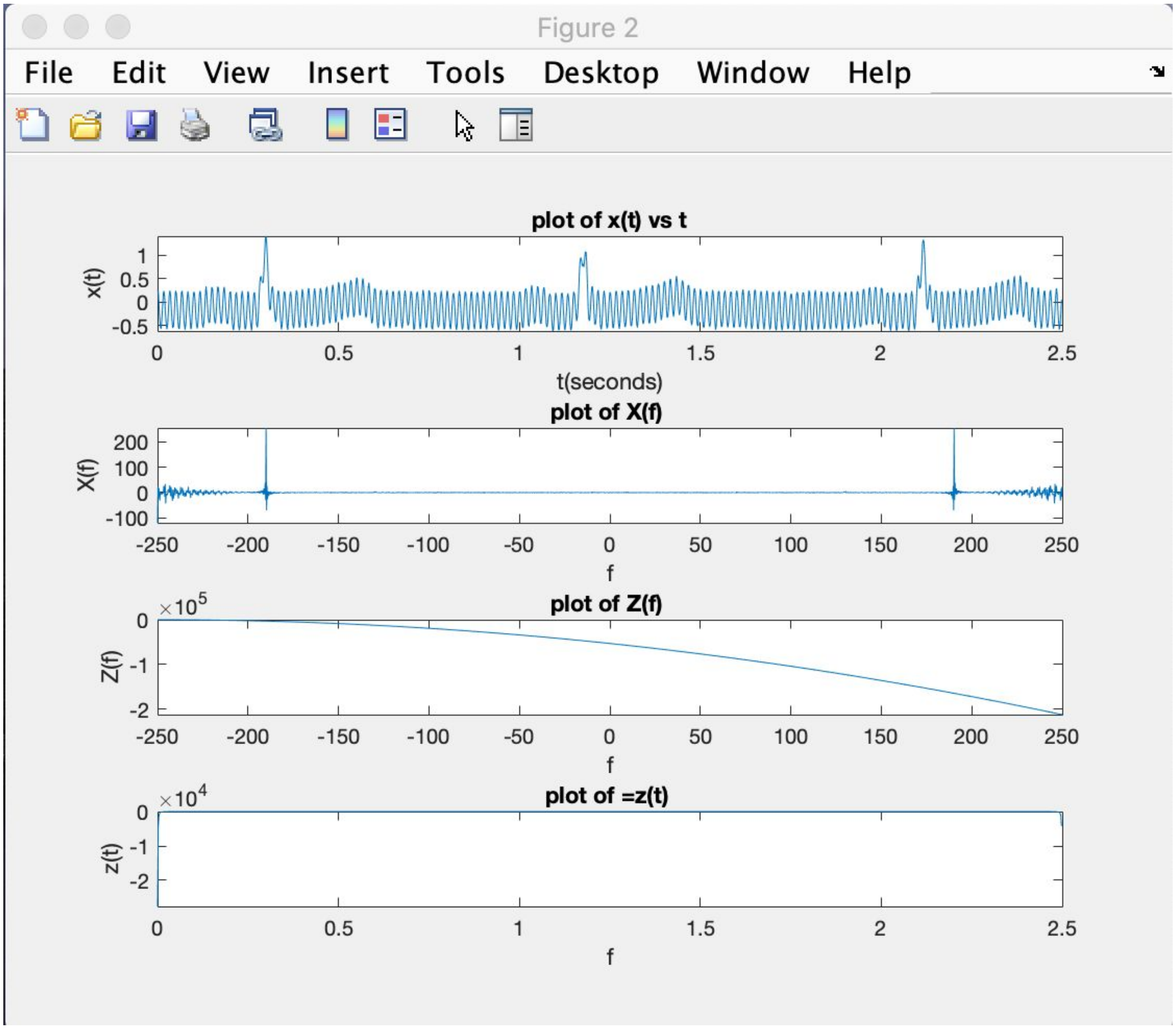

*Figure 2 above is the plot of x(t), X(f), Z(f), and z(t)

- Problem 2:

  For this problem we were finding the energy of x(t) and z(t) as well as using Parseval's theorem in order to find the function for energy and plot the energy spectrum of the signal(I used the formula energyZw(i) =summation(realXw(i) ^2 + imaginary(Zw(i))^2))

  For energyxt I calculated .3124 joules

  For energyzt I calculated 1.471*10^8 joules

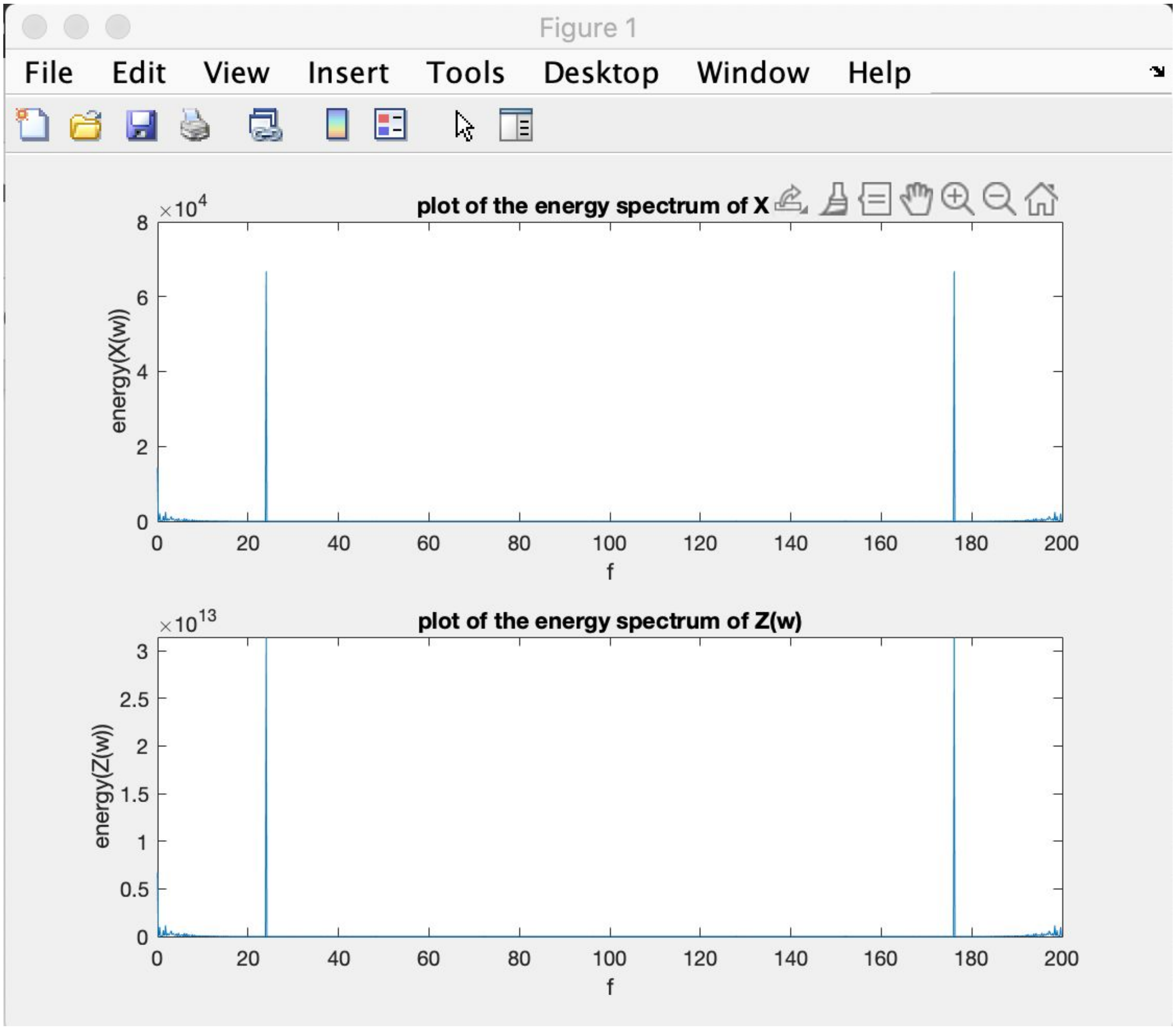

*Figure 3 above is the energy spectrums for X(W) and Z(w)

- Problem 3:
  For this problem I personally modified the provided program dsb_sc_modulation.m in order to simply return me the requested data: the time domain signal transmitted s(t), frequency domain magnitude of the transmitted signal |S(f)|,time domain demodulated and low-pass filtered output signal vo(t)and corresponding frequency domain spectrum |Vo(f)| I personally had some issues with this as there were no clear examples of how to solve this problem, fortunately I stumbled upon the m-file mentioned above and ended up with the following results below:

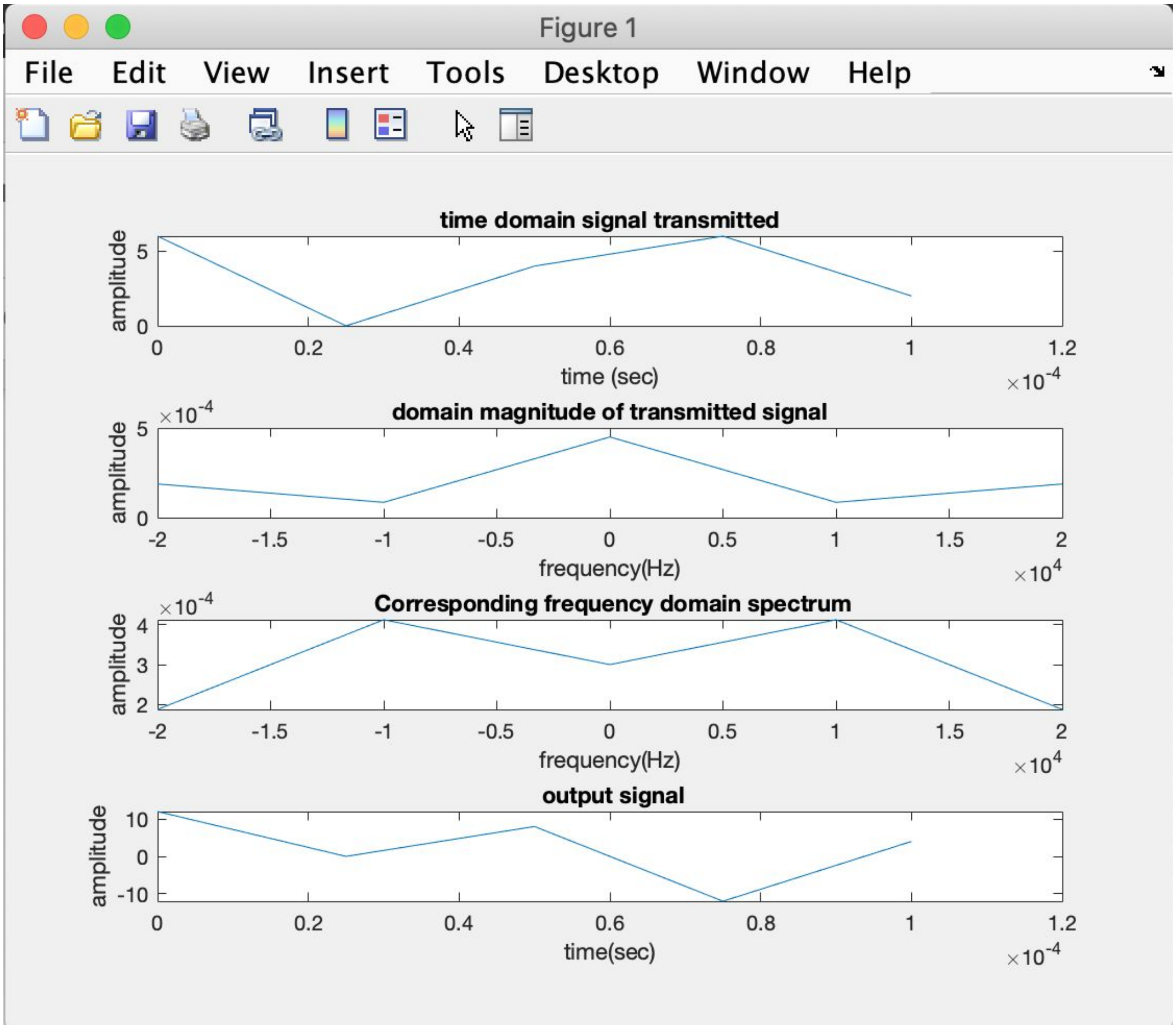

*Figure 4 above is the 4-1 plot of the data requested