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Assignment 5
8/17/2020

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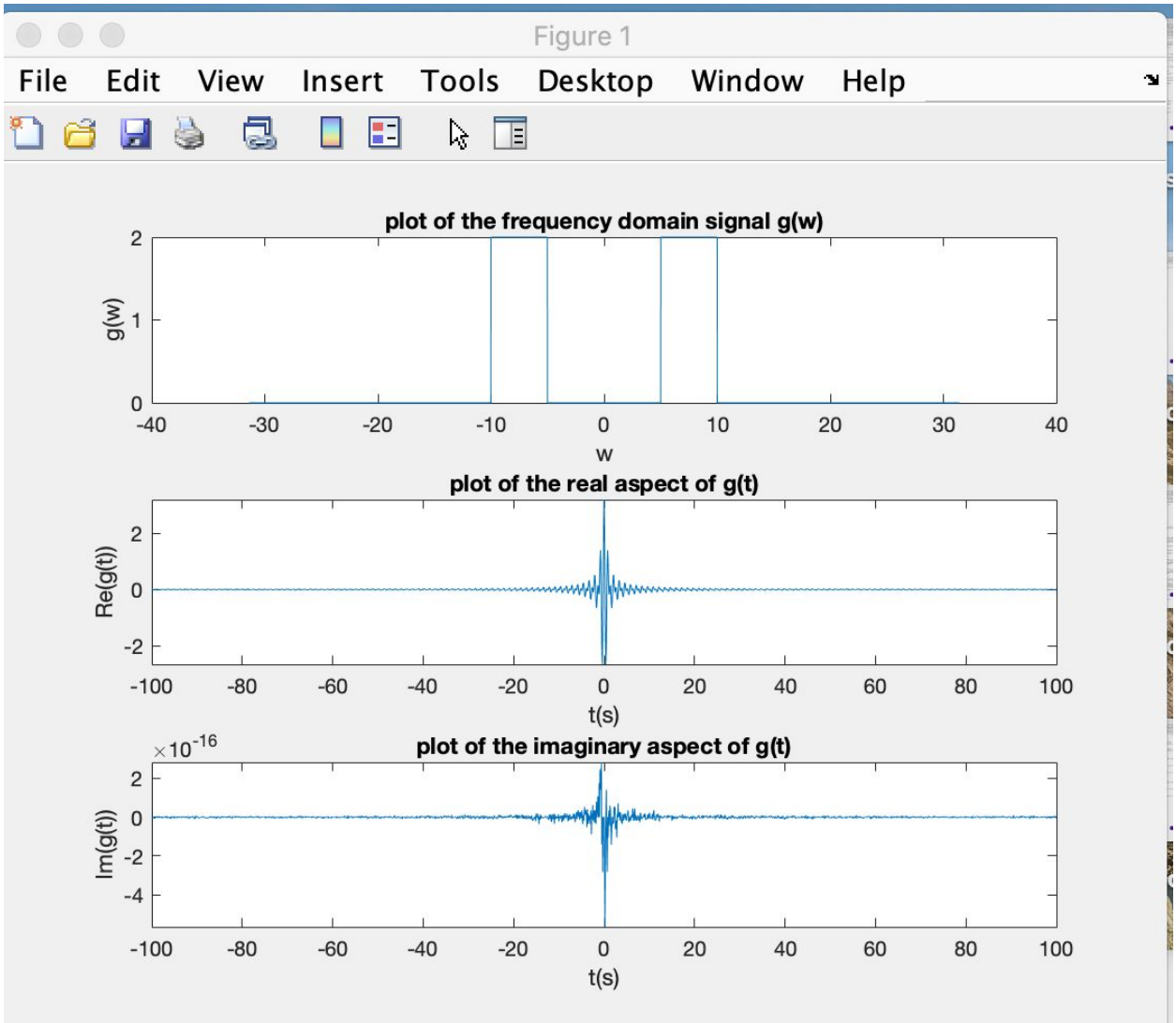
- Problem 1:
  For this problem we were given the frequency domain signal and were required to use the fourier transformation formula in order to attain the original function. In the second part of this problem we are required to simply repeat part a but with g(w-5) shifting the original function to the right. For part 3 we are asked if the signals are complex signals or real-signals and the answer is complex signals as the signals have both a real aspect as well as an imaginary aspect.



The figure 1 above me is the results from part a.

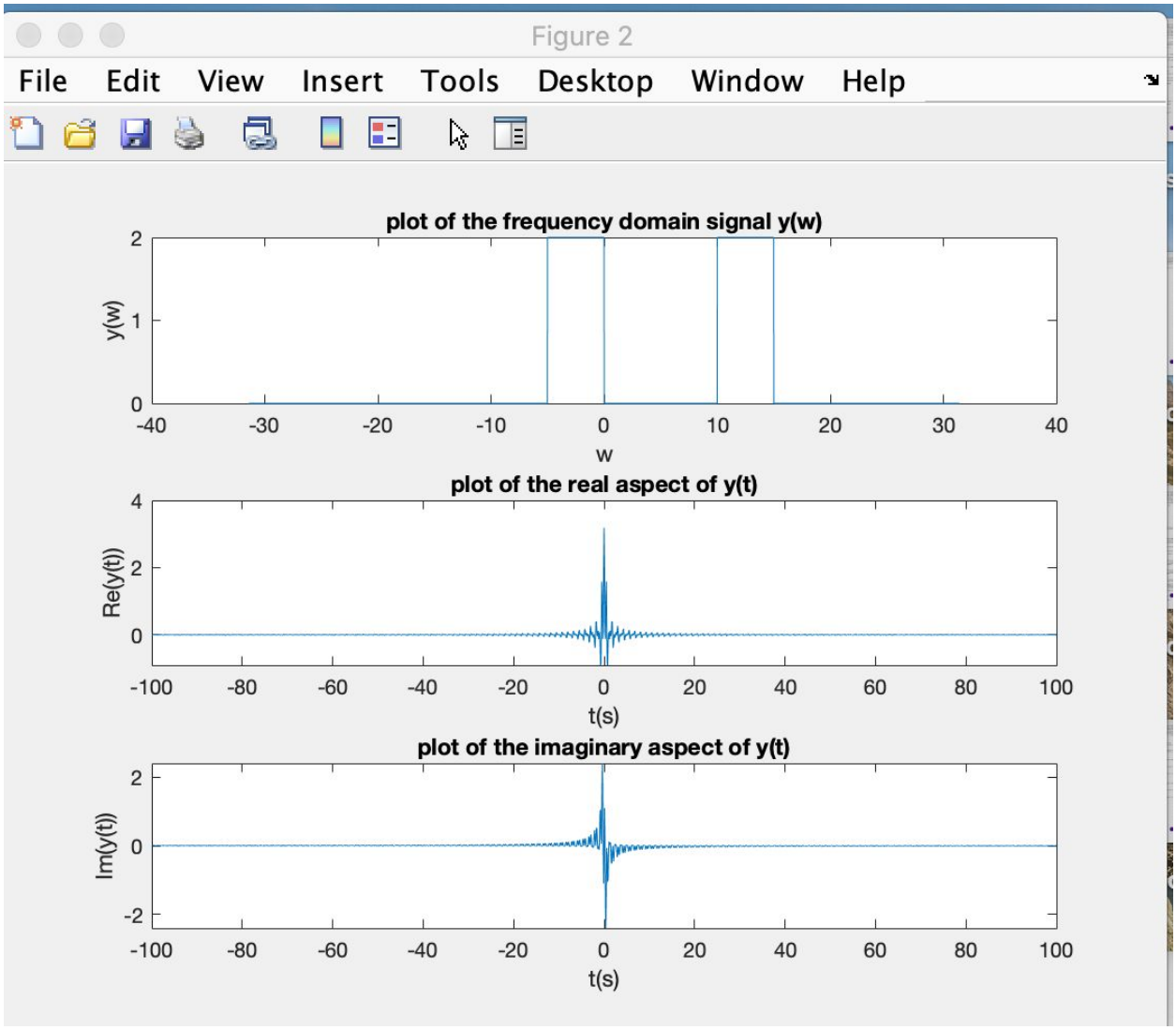
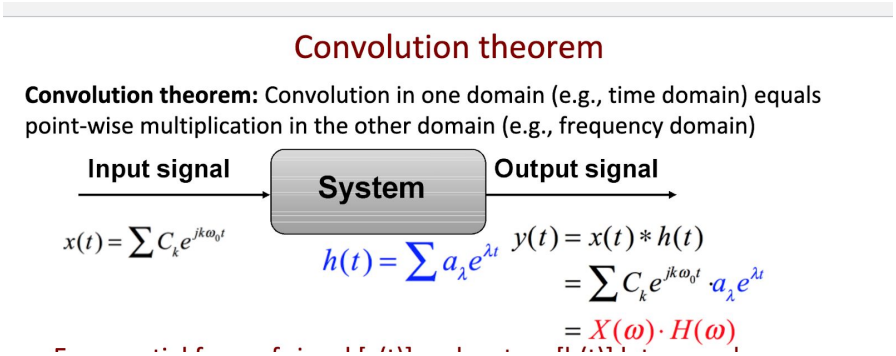


Figure 2 above is the results for y(t) = g(w-5) or part b.

- Problem 2:
  For this problem we given a filter h(t) and told that the input signal g(t) goes through the filter in order to create m(t). The first part simply asks for us to use the convolution theorem as seen in figure 3 below where we can simply



Multiply H(w) and g(w) and plot the results. In part be we are essentially doing part a from problem one where we are using the inverse fourier transformation in order to find the output signal m(t).

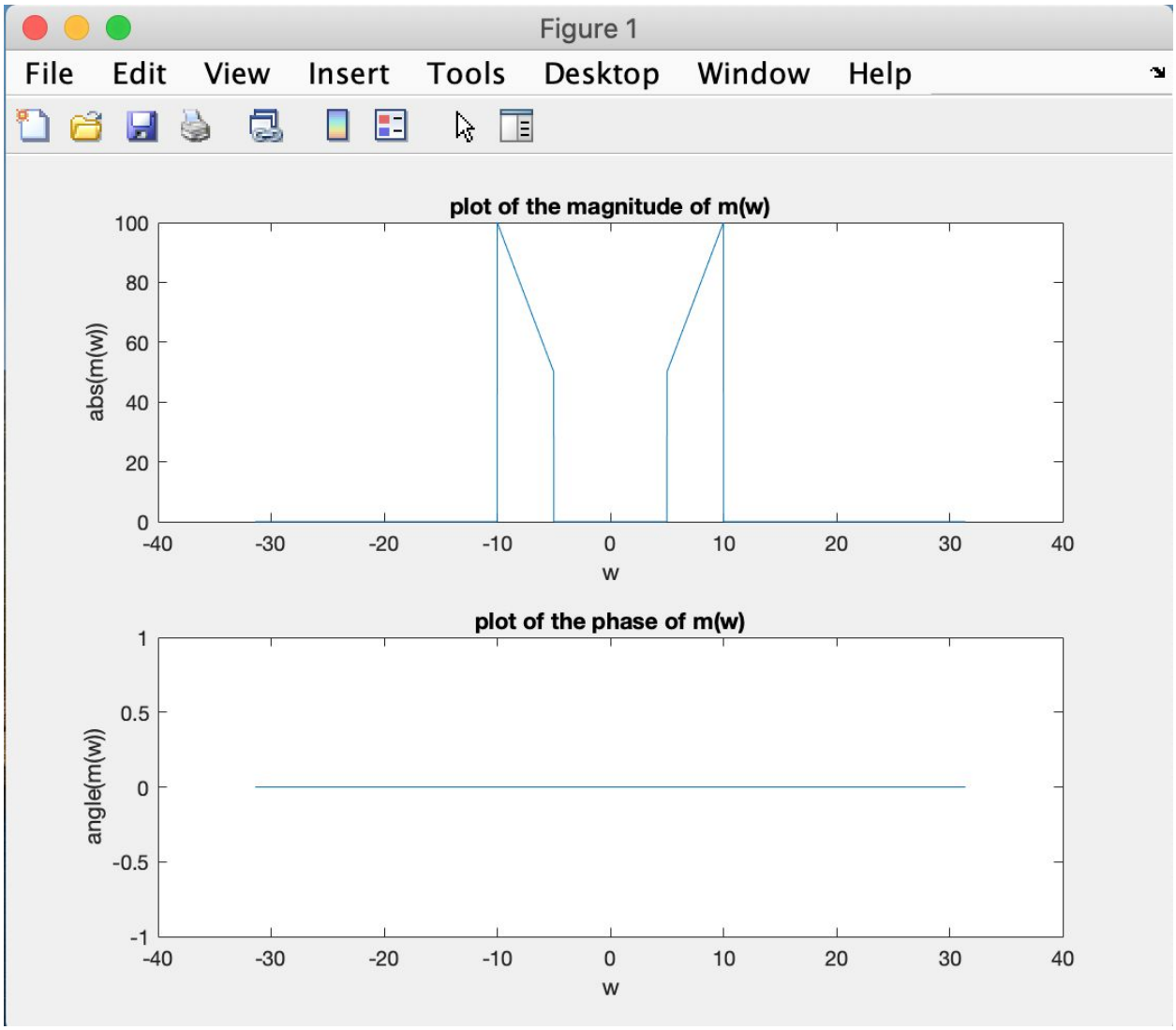


Figure 4 above is the magnitude and phase of the signal m(w)

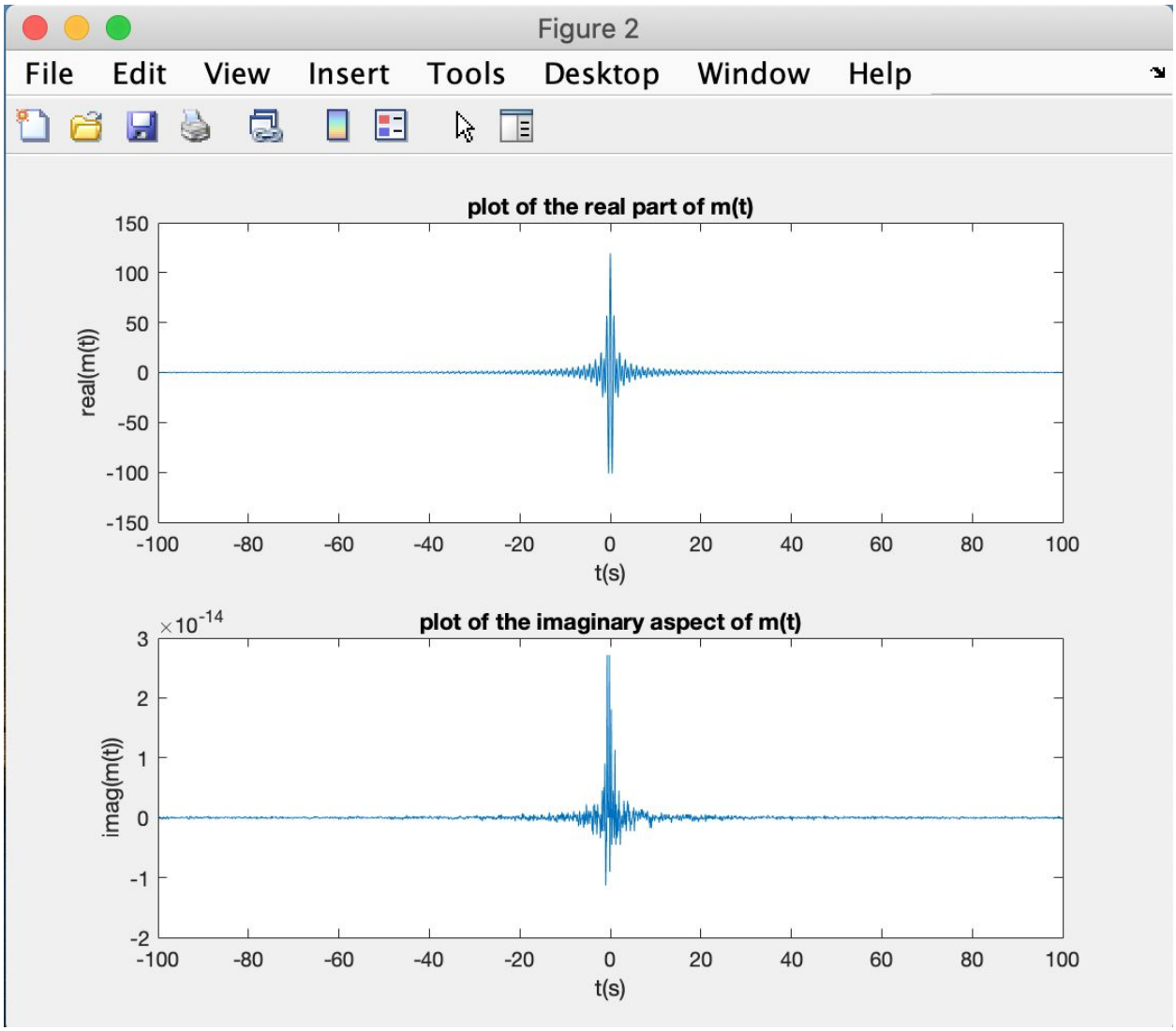


Figure 5 above is the real and imaginary aspect of the function m(t)

- Problem 3:
  For this problem we are simply finding the energy from m(t) using two different methods: one being the standard formula e = integral(abs(x(t))^2 dt) The second method is from parseval's theorem which states that we can use the omega function and simply do E = 1/2pi * integral(abs(m(w))^2 dt). Personally the results were slightly different and I believe that this is due to the fact that the trapz function is slightly inaccurate resulting in some inaccuracies as ultimately this is an estimate: personally I received e = 9.2844e for the first method and 9.2960e for the second method.