EE352 – Communication Systems I Laboratory

Lab 1 Report

Signals & Systems Review

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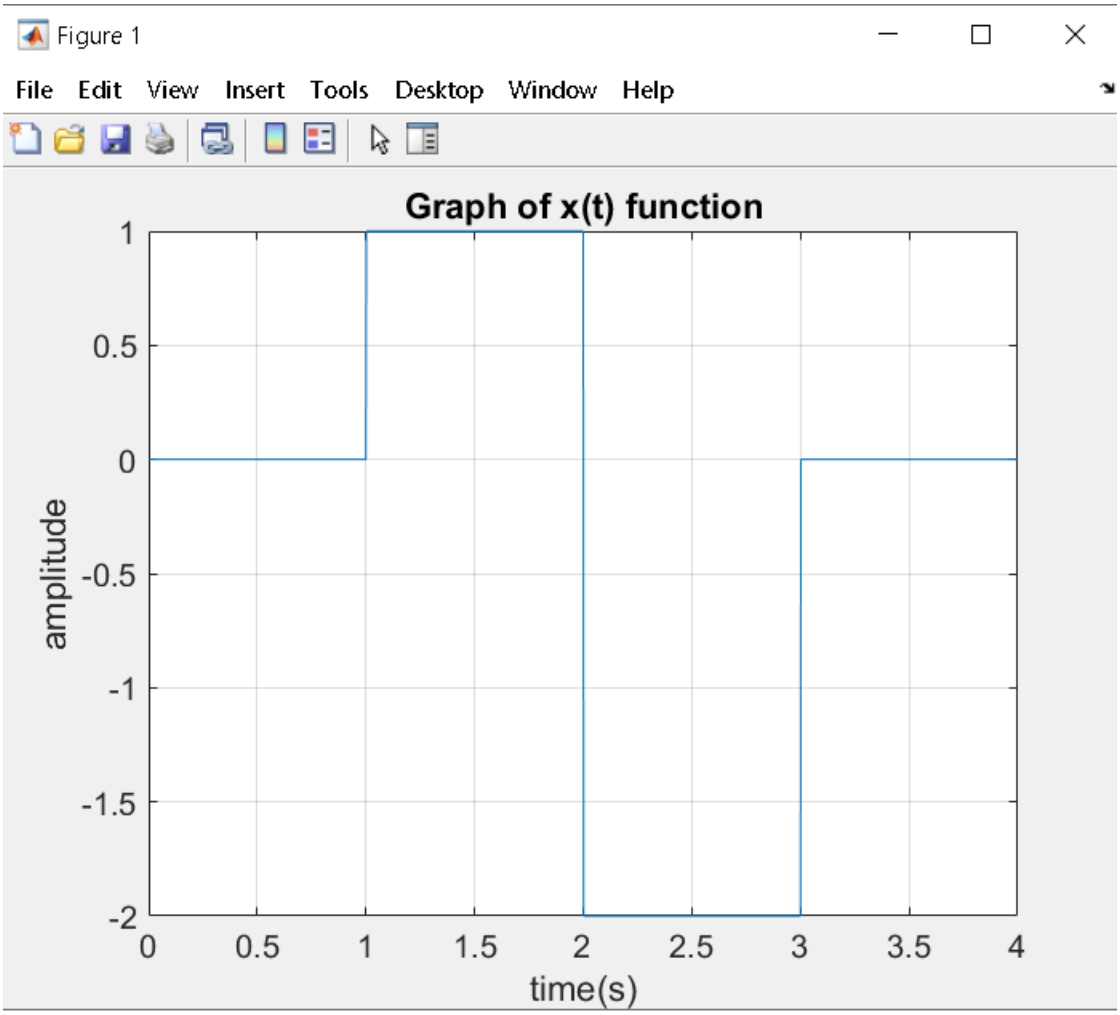
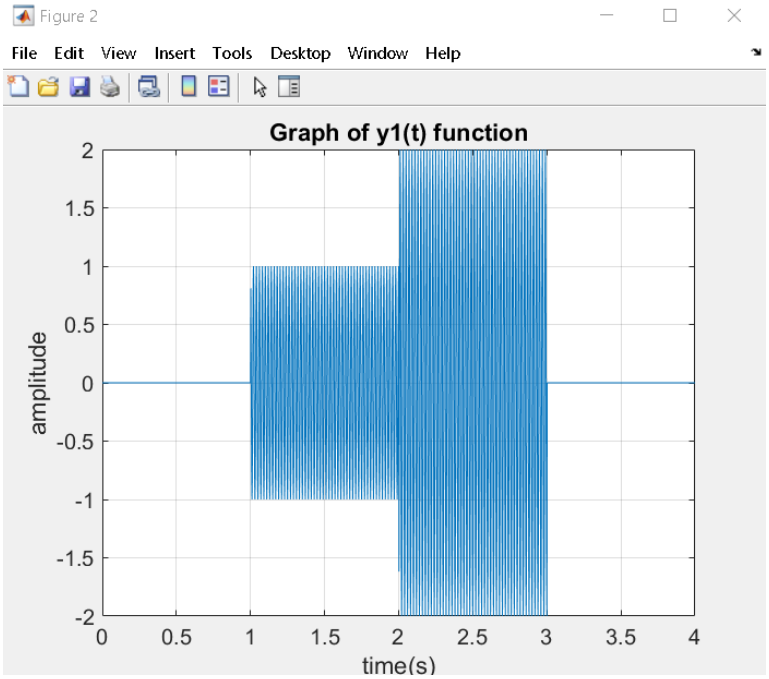
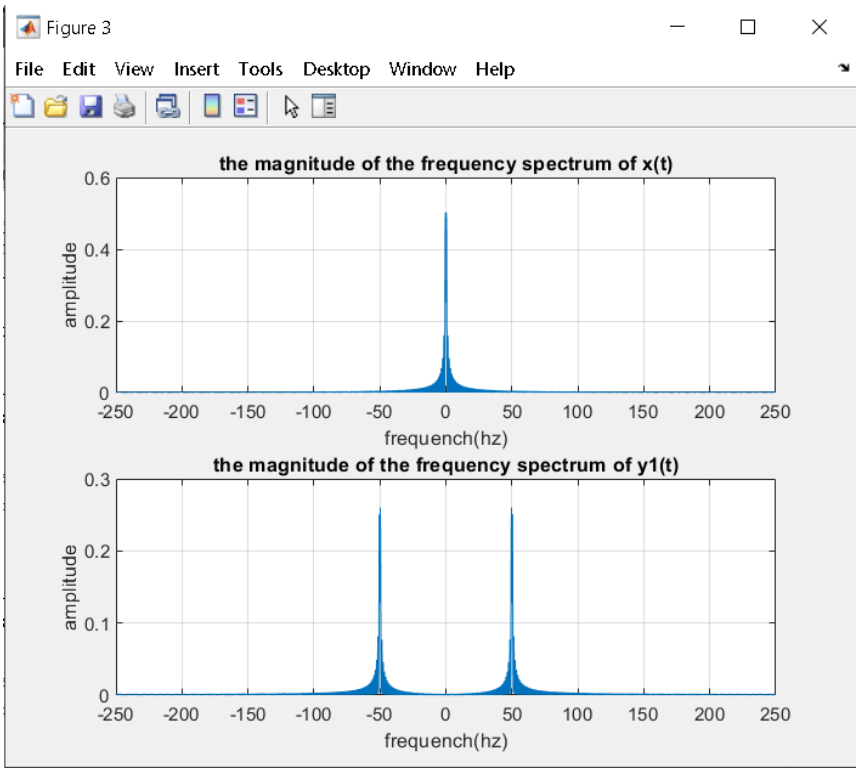


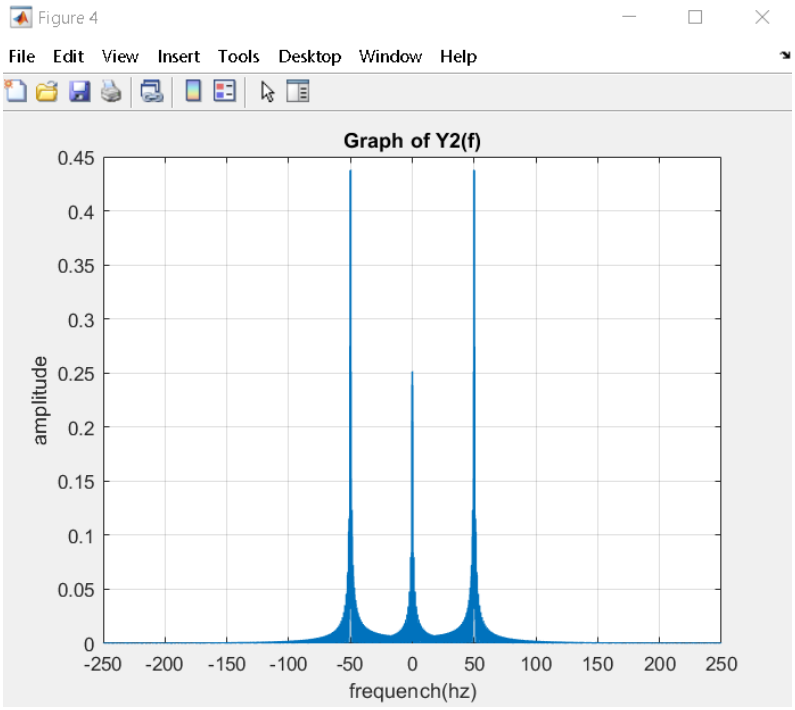
➔ We generated the whole signal x(t) from the piecewise function, which is defined in procedure. If we examine the magnitude values according to the time values, we can say that we have obtained the desired signal correctly. We used given time value 4s in procedure.



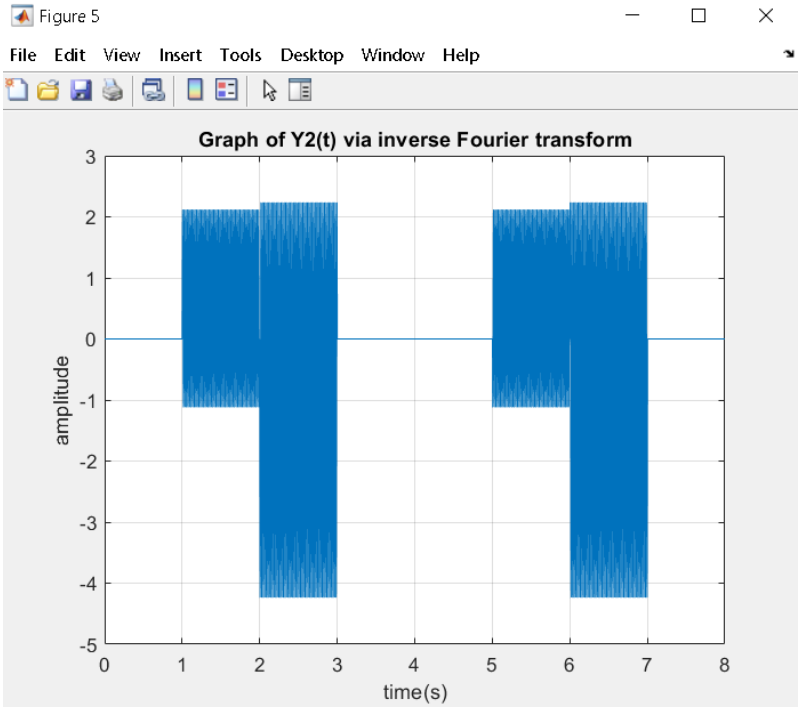
➔ We get y1(t) function from multiplicaton of x(t) and x2(t), we did it with dot product in Matlab. X2(t) is the given function which is equal to cos(2π50t). We can see, we used given time value 4s in procedure.



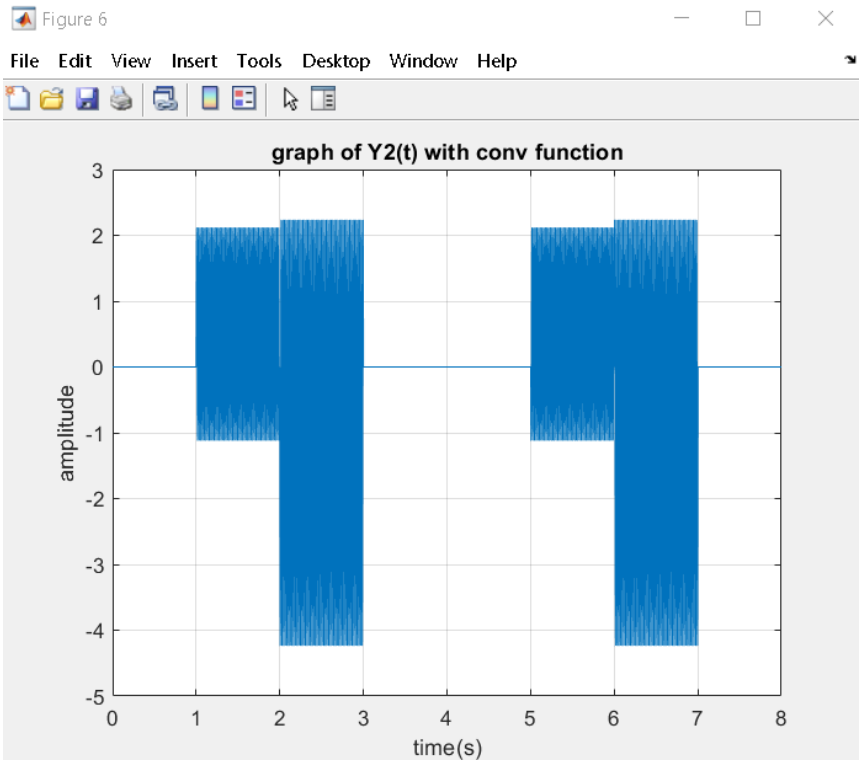
➔ In this graph, we can see Fourier transforms of x(t) and y1(t). We switched from time domain to frequency domain. Also, we can see negative part of the frequency spectrum in our figure. We can see peak value at 0hz in upper graph, because signals with a frequency of 0 have a peak at point 0. Also, in down graph, we can see peak value at 50 and -50 Hz. We can see both of these graphs are symmetric.



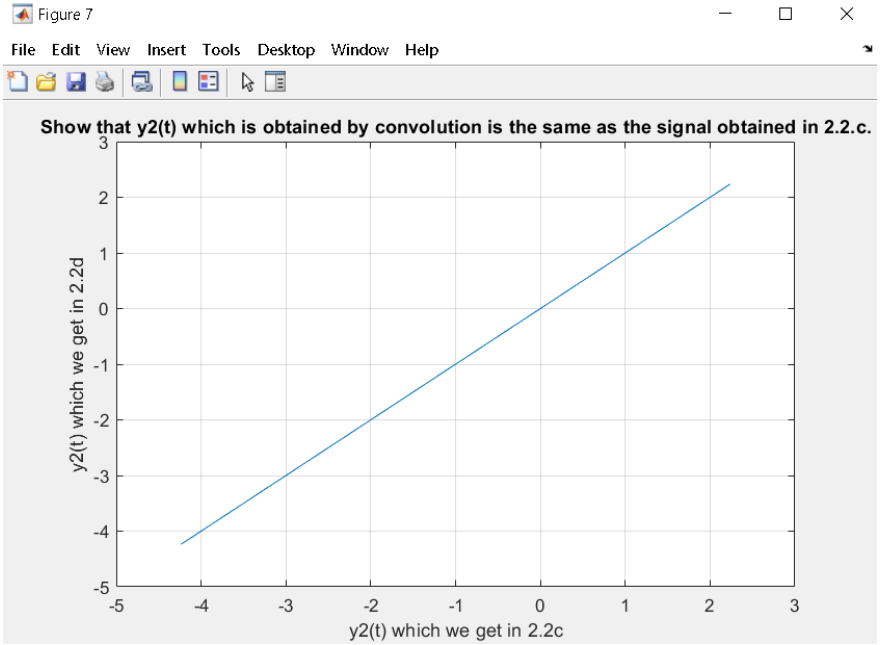
➔ In this graph, we obtained the output signal Y2(f) in frequency domain by using the Fourier transforms of x2(t) and x(t) by using dot product in Matlab. We changed the our N(number of DFT points) value with 2N-1, because of convolution property. Convolution operation in time domain equals multiplication in frequency domain.



➔ In this graph, we can see result of inverse fourier transform function(ifft) using for signal which is we get previous graph. We switched from frequency domain to time domain. Also, we can see our time is not 4 seconds, it is 8 seconds, because due to convolution process, our time is doubled.



➔ In this graph, we can see result of convolution of x(t) and x2(t) signals. We can also say that our time has doubled due to the convolution process.



➔ In this chart, we see a comparison of the signals we get in 2c and 2d. When we examine the values, we can say that the signal we get at both stages is the same. We expected these results to be the same, because we did the convolution operation in the 2d step, on the other hand, in the 2c stage, we converted our signal, which was previously translated into fourier transform and multiplied, back to the time domain with the help of the IFFT function, which means that we actually did the same operation.