LAB TASK 9: DTFS

# Pre-Lab:

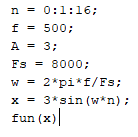
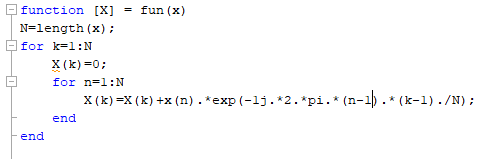
For a DT signal with fundamental period , the DTFS synthesis and analysis equations are given by (1) and (2), respectively.

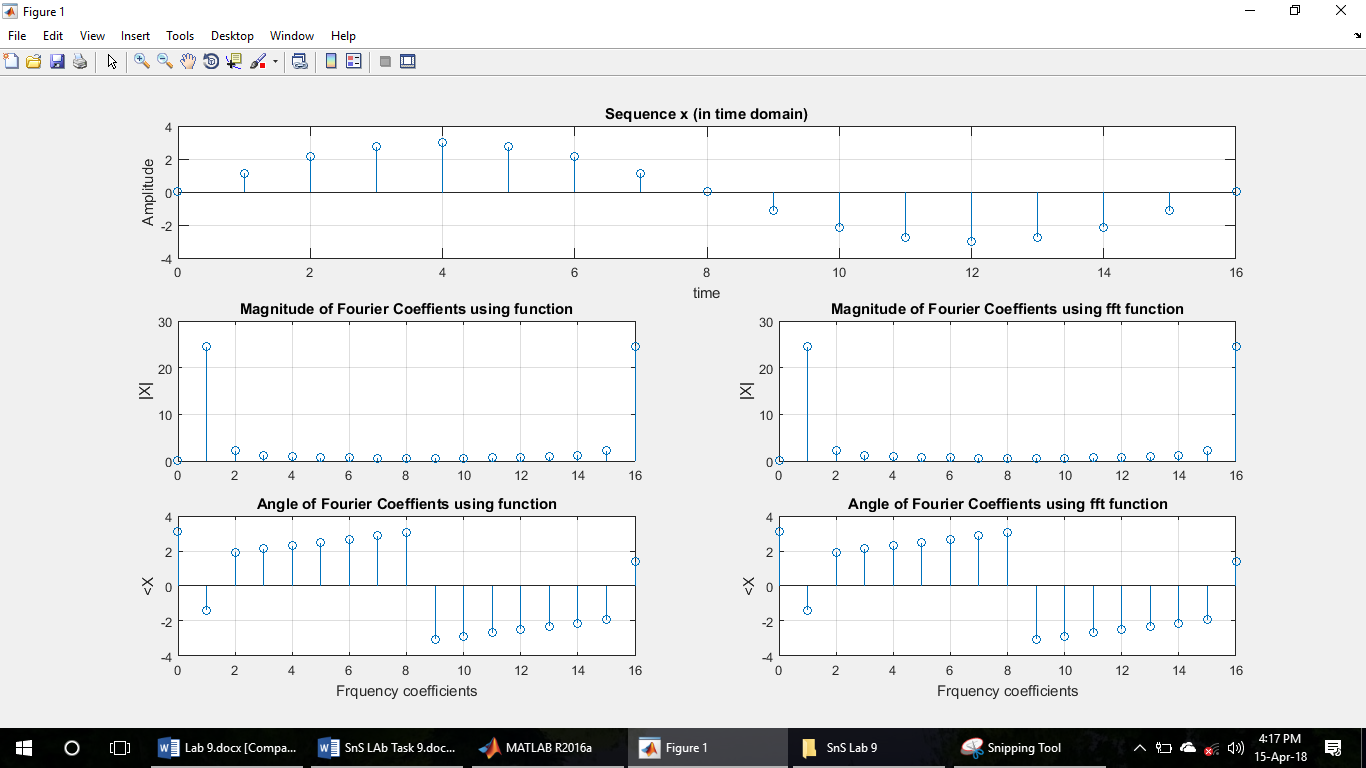
(1)

(2)

Remember that has period *,* so that the summation in (2)can be replaced with a sum over any consecutive values of *.* Similarly, is periodic in with period so that the summation in can be replaced with a sum over any consecutive values of .

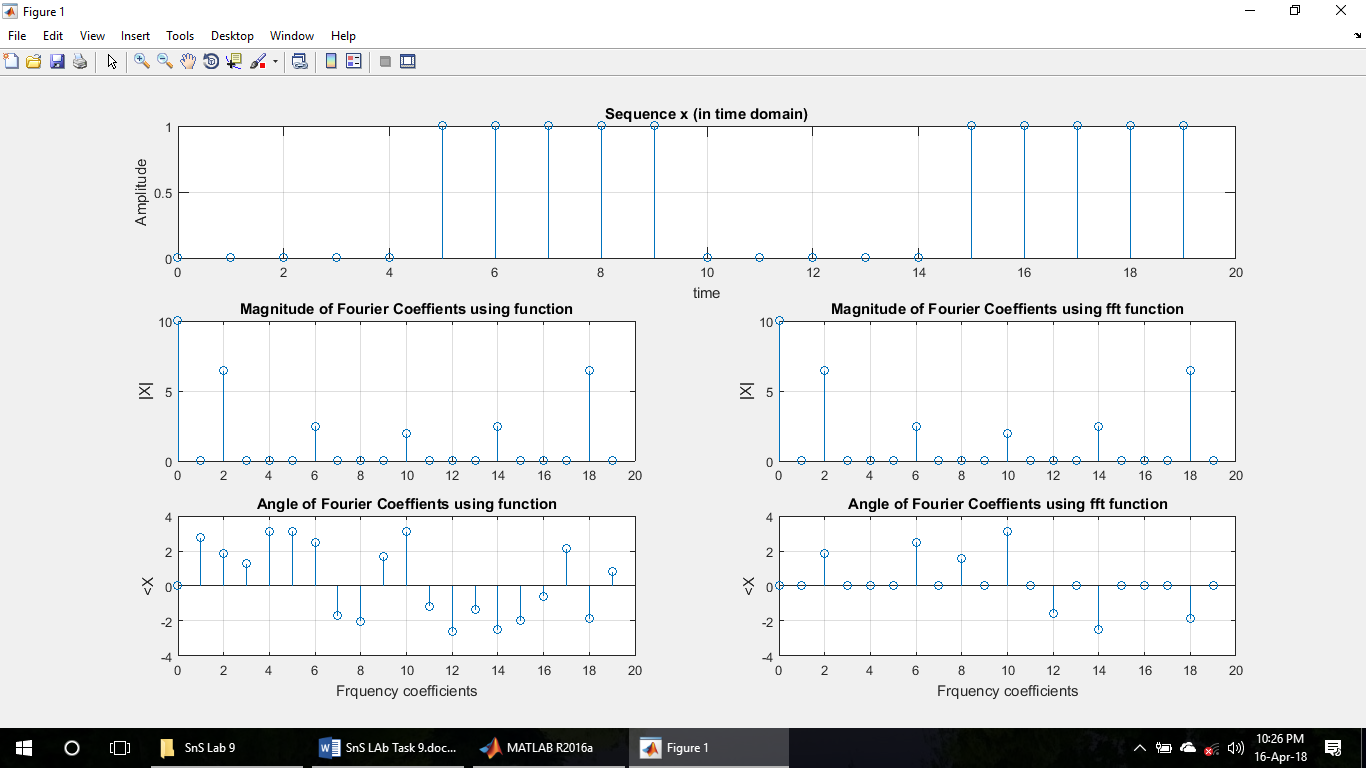
# Fourier Series:



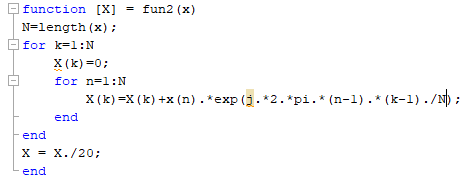
## Fourier Series of Discrete Time Square Wave:

When the Square wave is applied to the function, then the output is as follows;

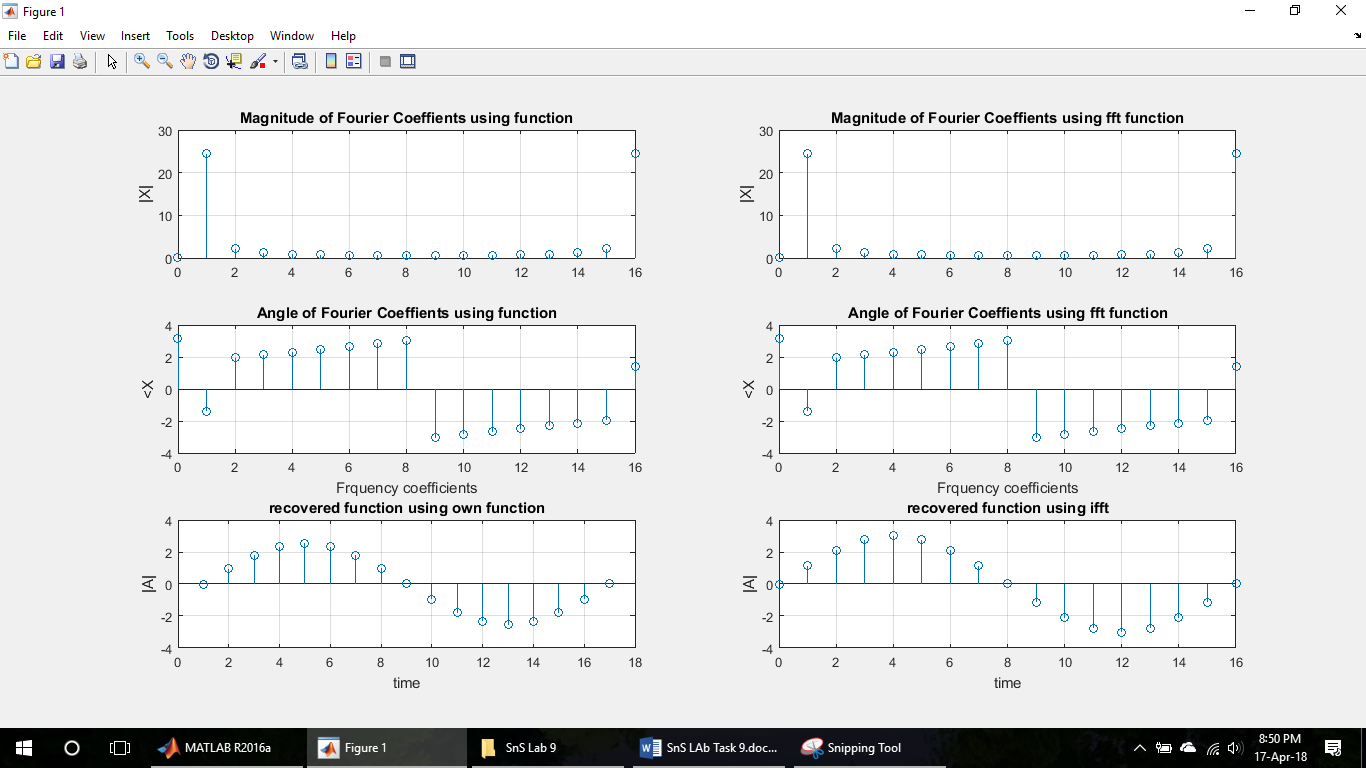


# Inverse Fourier Series:

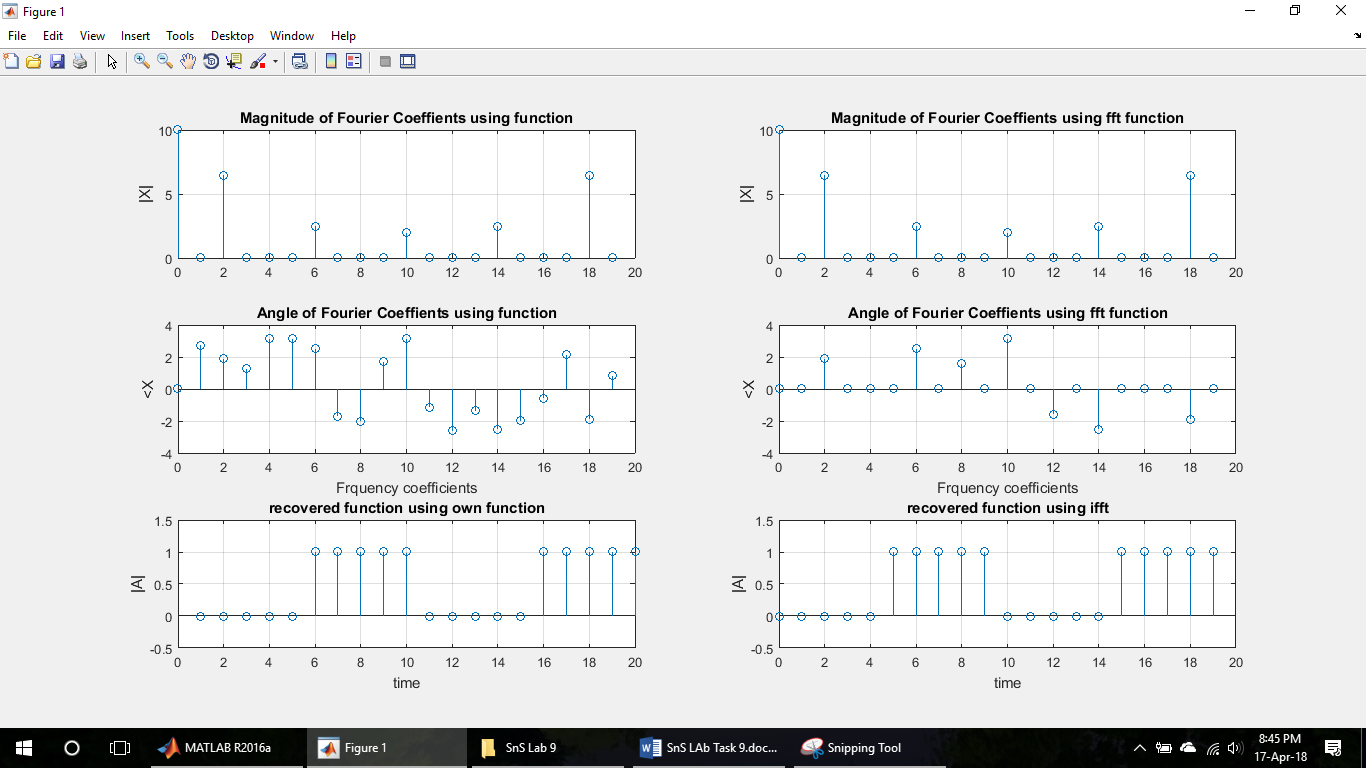
## Inverse Fourier series Function:



## Inverse Fourier series of Discrete time sinusoidal Wave:



## Inverse Fourier series of Discrete time Square Wave:



# Conclusion:

In this lab, I learnt about the discrete time Fourier series and discrete time inverse Fourier series MATLAB built in functions (i.e. fft, ifft). I also constructed our own functions in MATLAB for Fourier series and inverse Fourier series. Using the aforementioned functions, I found out the Fourier series coefficients, plotted them, and then using them, I reconstructed the original signal. This task was done on the two signals (i.e. discrete time sinusoidal signal, discrete time square wave signal).