Experiment 1

1 Aim of the experiment

Familiarization of elementary functions and simple manipulations on the signals.

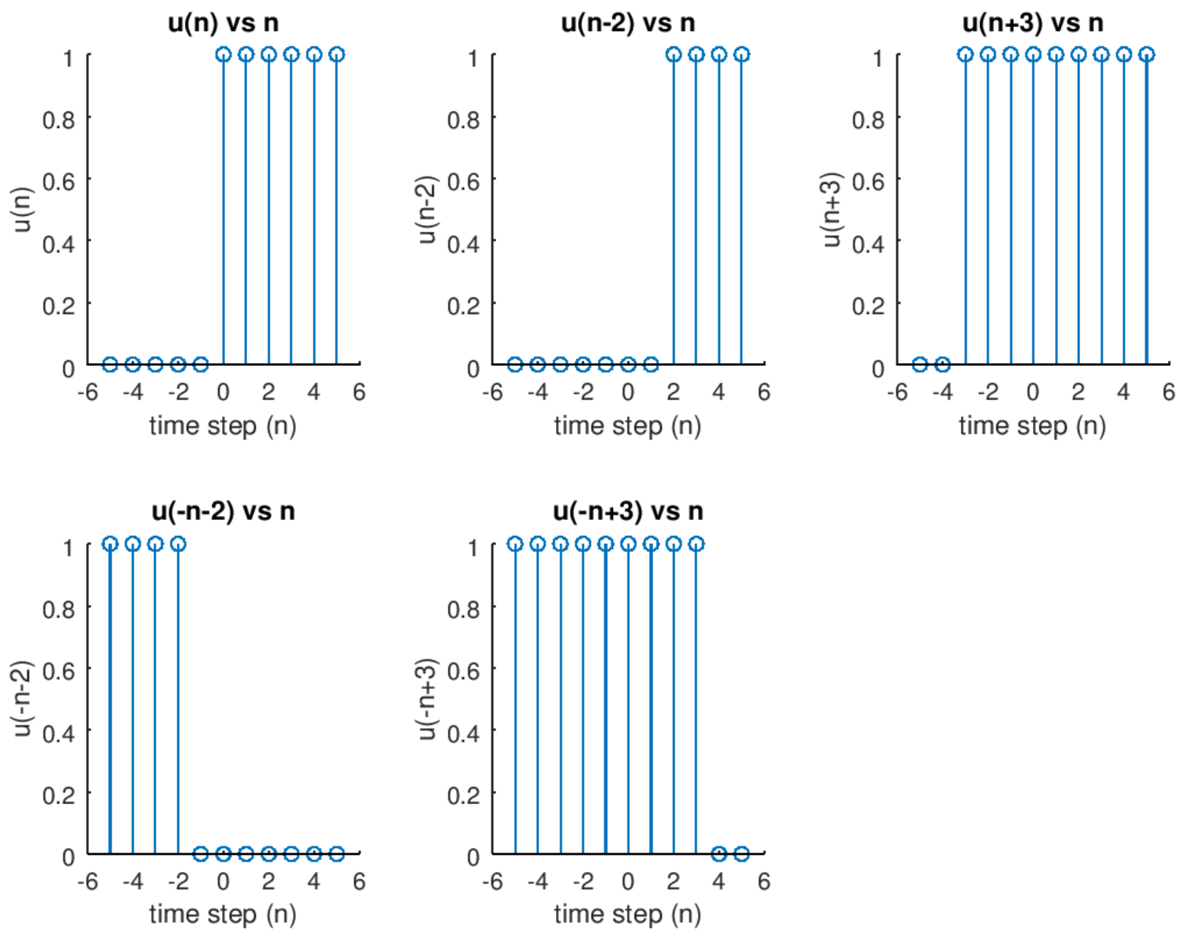
2 Results/Graphs

2.1 Question 1

Create a user-defined function mystepfun(n) to generate discrete time step function u(n) for $-5 \leq n \leq 5$ and plot the following signals.

The obtained plots are shown below :-

Figure 1: For Question 1



2.2 Question 2

Plots of function $e^{-0.01n}\sin(0.02\pi n)\ \forall\ -100 \leq n \leq 100$ and odd & even parts of the same.

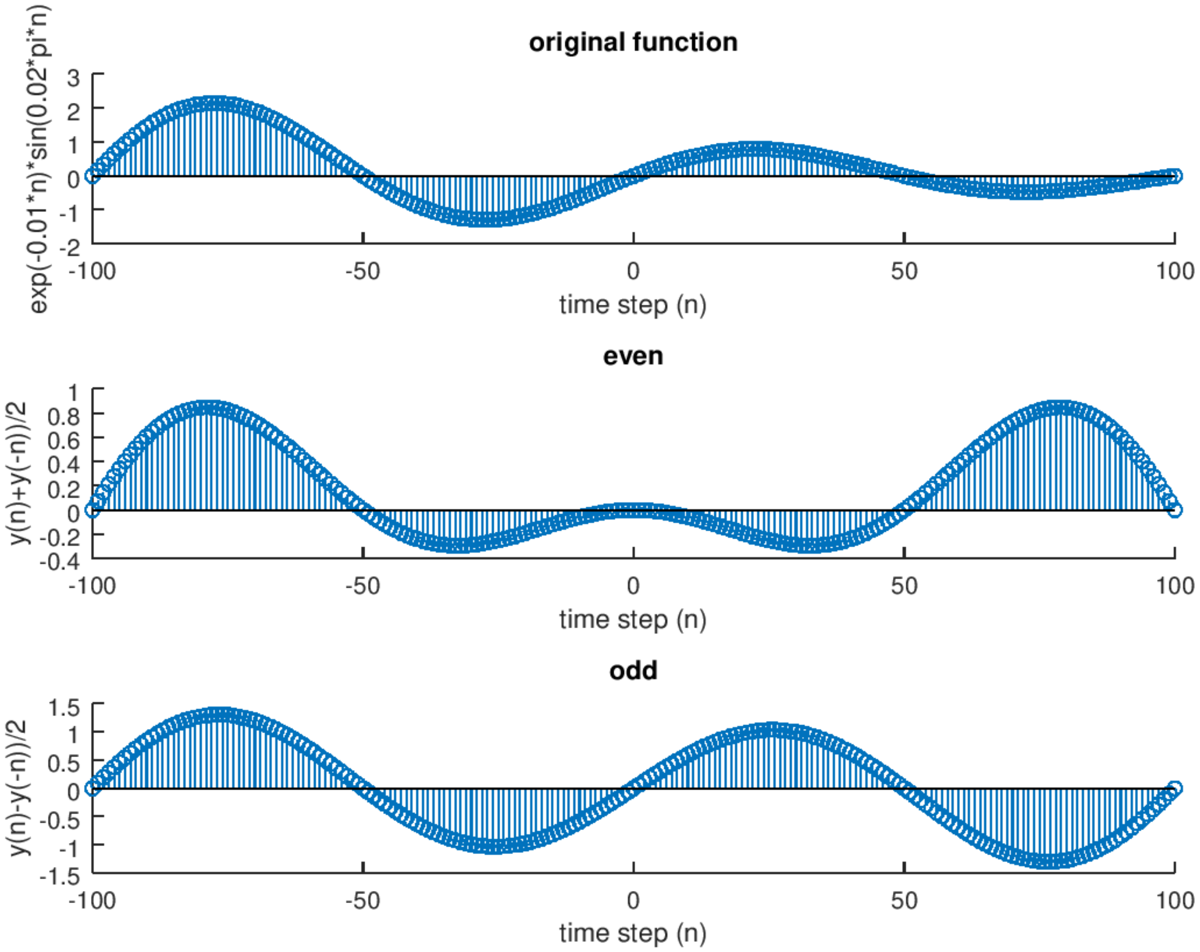


Figure 2: For Question 2

From the above figures we can observe that the signal is converging. The odd part of signal is antisymmetric and the even part is symmetric about x=0 line.

2.3 Question 3

Result obtained by convolving the following sequences $x(n) = 1 \; \forall \; 0 \leq n \leq 3$ and $y(n) = n \; \forall \; 0 \leq n \leq 4$ is the following sequence $z = [0\ 1\ 3\ 6\ 10\ 9\ 7\ 4]$

The length is given by $Length(z) = Length(x) + Length(y) - 1 = 4 + 5 - 1 = 8$

conv([1 1 1 1], [0 1 2 3 4]) = [0 1 3 6 10 9 7 4]

2.4 Question 4

An audio file is convolved with 2 different filters. After listening to the output wave files, obtained from convolution with the 2 filters, we can observe that one of them was a high pass filter while the other was a low pass filter.

The following are their plots (Unscaled) in frequency domain. We can clearly see that they are low pass and high pass filters respectively.

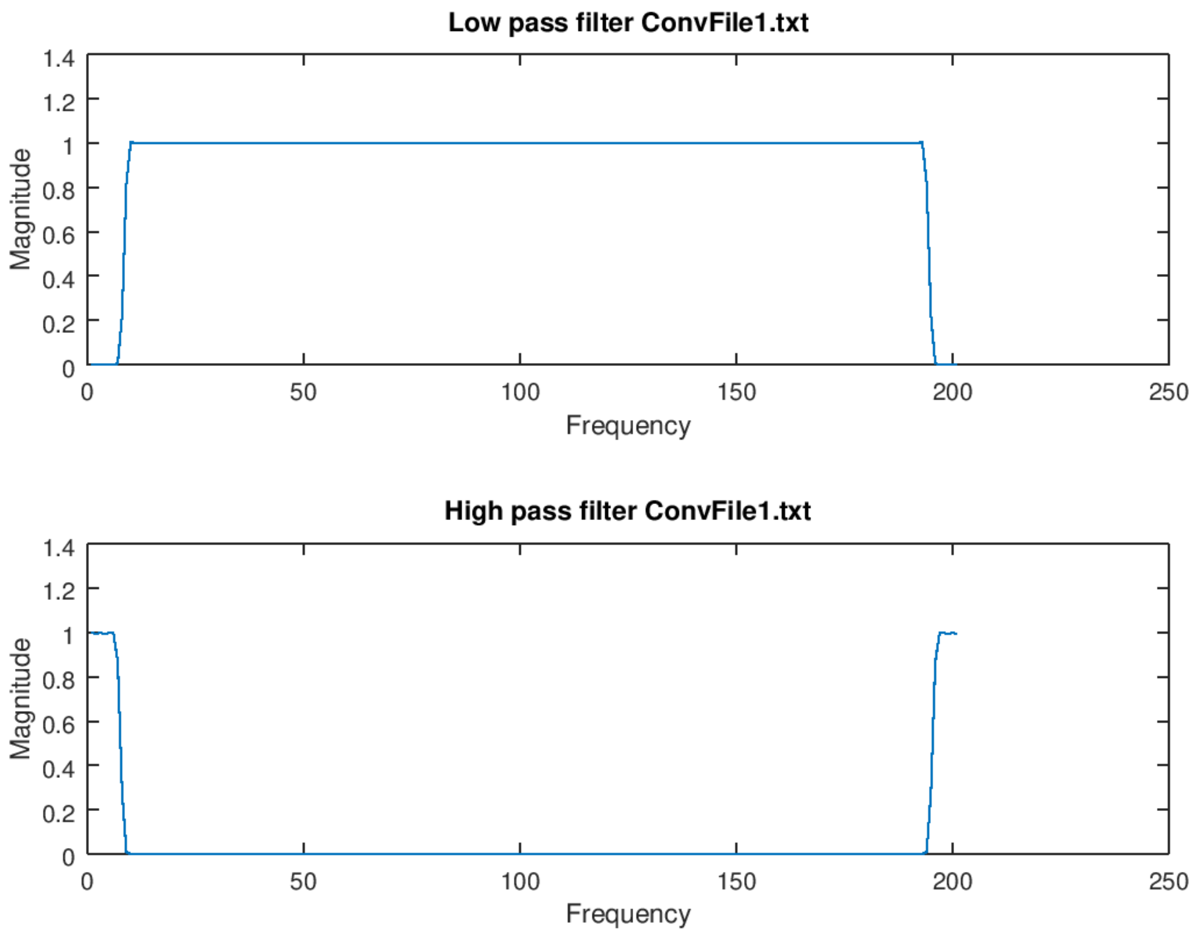


Figure 3: For Question 4

3 Conclusions

By performing the above experiments and plotting the graphs, we get familiar with using functions (and using time reversal and shifting), plots & subplots, using the conv function for performing convolution, and getting a practical feel of convolution by listening to the output of high & low pass filters applied on a music track.