Experiment No.8: Digital Signal Processing using Simulink

Objectives:

1) To study how to use simulink for Digital Signal Processing
2) To study sampling theorem in simulink
3) To find response of a system described by a difference equation in simulink

Simulink Simulations:

1) Make a model in Simulink to observe time and frequency responses of a sine signal with 100Hz fundamental frequency. Also observe the effect of change in sampling frequency on discrete time sine signal.
2) Make a model in Simulink to observe time and frequency responses of addition of two sinusoidal signals with frequencies 100Hz and 500Hz respectively.
3) Make a model in Simulink to play an audio signal '*handel.mat'* and plot its frequency spectrum.
4) Make a model in Simulink to observe the spectrum of an original and noisy audio signal.
5) Plot the response $y(n), n \geq 0$, of the system described by the second-order difference equation,

$$y(n) - 3y(n-1) - 4y(n-2) = x(n) + 2x(n-1)$$

to the input $x(n) = 4^n u(n)$.

Conclusion:

1) What is the difference in the spectrum of an original and noisy audio signal in Q.4
2) Compare Direct form-I and II realization of the system described in Q.5?