SDM College of Engineering & Technology, Dharwad-02
Department of Electronics & Communication Engineering
V Semester

Course: Digital Signal Processing Laboratory **Date:01.10.2022**

Course Code: 18UECL505

TERM WORK-II

Exp. No.	Problem statement	CO Mapping	Marks
4.	**Perform linear filtering of long data sequence using DFT**		
	Given h(n)=[1 -1 1], find the response for the input sequence x(n)=[1 2 1 -1 2 -2 3 4 0 1 -1 -2 -3 0 1 -2 3 2]. Consider DFT block length of N. Use: i. Overlap-add method ii. Overlap-save method.	**2**	**5**
5.	**Demonstrate efficient computation of DFT.**	**2**	**5**
a)	**Computation of DFT of two N-point sequence using single N-point sequence.** Compute DFT of $x(n) = \begin{cases} -1, & 0 \le n \le 1 \\ 1, & 2 \le n \le 4 \\ -1, & 5 \le n \le 7 \end{cases}$ and that of $h(n) = \sin\left(\frac{3\pi n}{8}\right); 0 \le n \le 7$ using single 8-point DFT. Verify the result by computing DFT individually.		
b)	**Compute DFT of 2N point sequence using single N-point sequence.** Compute 16-point DFT of a real sequence $x(n) = (-1)^n$; $0 \le n \le 15$ using single 8-point DFT.		
6.	**Perform frequency analysis of signals using DFT.**	**3**	**5**
a)	**To understand the effect of window length on the signal spectrum:** Consider the signal $x(n) = \cos(0.04\pi n) + \cos(0.02\pi n)$ Perform the frequency analysis by taking 512-point DFT by multiplying signal with rectangular window with signal length i) L=25 ii)L=50 iii)L=100 iv) L=200. Find the minimum value of window length so that all the frequencies are clearly distinguishable. Compare the magnitude spectrum in each case and comment on the effect of window length**.**		

b)	**To understand the effect of using different windows:** Perform the frequency analysis of the signal x(n) = cos(w_on) + cos(w_1n) + cos(w_2n) where w_o = 0.2π, w_1 = 0.22π, w_2 = 0.6π using rectangular window using minimum value of window length so that all the frequencies are clearly distinguishable. Observe the frequency spectrum by using hamming window. Comment on the results.		
c)	**To understand the effect of zero padding on the signal spectrum:** Perform the frequency analysis of the signal $x(n) = \cos(0.04\pi n)$ by taking 64-point DFT. Modify the rectangular sequence to length 256, 512, 1024 by appending zeros and plot the frequency spectrum. Comment on zero padding effect.		

Note: Last date to complete term work-II: 12.11.2022

Lab In-charges **HOD (E&CE)**

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