SDM College of Engineering & Technology, Dharwad-02
Department of Electronics & Communication Engineering
<u>V Semester</u>

Date:01.09.2022

Course: Digital Signal Processing Laboratory **Course Code: 18UECL505**

Course Credits:1.5 **Hours: 3hrs/week**

<u>TERM WORK-I</u>

Exp. No.	Experiment title	CO	Marks
1	**Basic signal processing operations and manipulations**	**1**	**5**
a)	Generate the following sequence/signal, plot and label the sequences i. Unit sample sequence ii. Unit step sequence iii. Sinusoidal sequence with frequency fc = 2Hz. iv. Exponential sequence (Exponential rise, Exponential decay), plot in the same figure window and different figure windows. v. Generate AM, DSBSC with fc = 100Hz, fm = 2Hz. Plot m(t), c(t), AM, DSBSC in same figure window and different figure windows. vi. Generate a signal s(t) = 2cos(2*pi*10t). Add a random noise signal. Plot the original signal, random signal and noisy signal in same figure window, different figure windows, overlapped figures using different colours.		
b)	Obtain transfer function, partial fractions and inverse Z-transform for the given H(z). $H(z) = \frac{(z-1)(z-2)(z-3)(z-4)}{(z+1)(z+2)(z+3)(z+4)}$. i. Obtain the transfer function in terms of negative powers of z **(Use zp2tf)**. From the result, obtain the transfer function back in factored form **(Use tf2zp)**, quadratic form (**Use zp2sos)** and plot its poles and zeros **Use (zplane).** ii. Obtain its partial fraction expansion. **(Use residuez).** iii. Determine its inverse z-transform up to length, L=10 **(Use impz)**		
2	**Obtain Linear and circular convolution of two given sequences.**	**1**	**5**
a)	Given the difference equation $y(n) - 0.2y(n-1) + 0.9y(n-2) = x(n) - 0.8x(n-2)$ i. Calculate and plot the impulse response h(n) at n= -20,………………,100. ii. Calculate and plot the step response y(n) at n=0,………………..,100. iii. Calculate and plot the response for the input $x(n) = a^n$, where a=0.5, n=0,…………,100. iv. Is the system specified by h(n) stable?		
b)	Given h(n)=[1 2 3 1] and x(n)=[1 2 1 -1], perform Linear convolution without and with built-in functions.		
c)	Given h(n)=[1 2 3 1] and x(n)=[1 2 1 -1] perform Circulation convolution without and with built in functions.		

3	**Compute N-point DFT, IDFT and verify the properties.**	**2**	**5**
a)	Consider any 8-point sequence. i. Find its DFT using the definition. ii. Verify the result using built-in function. Plot the magnitude and phase spectrum. iii. Obtain original signal from DFT values using IDFT with and without using built-in function. iv. Create dft_mtx() and idft_mtx() user defined functions to generate N-point kernel matrix of DFT and IDFT respectively. v. Find 8-point DFT of a sequence by calling user defined function dft_mtx(). vi. Reconstruct the original sequence by calling user defined function idft_mtx().		
b)	Considering suitable input sequence, verify the following properties of DFT. i. circular time shift ii. circular frequency shift iii. Parsevals theorem iv. symmetry v. circular convolution		

Last date to complete term work -1: 30.09.2022

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

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