Roll No .....

MEDC-103

M.E./M.Tech., I Semester

Examination, December 2013

DSP Application

Time : Three Hours

Maximum Marks : 70

Note: 1. Attempt any five questions.

2. All questions carry equal marks.

1. Examine the following systems with respect to the properties such as static or dynamic, linear or non-linear, Time invariant or time varying , causal or non-causal and stable or unstable.

a) $y(n) = \sum_{k=-\infty}^{n+1} x(k)$ b) $y(n) = sign[x(n)]$

c) $y(n) = x(-n+2)$ d) $y(n) = x(n^2)$

2. a) Determine the zero input response of the system described by the second-order difference equation

$$x(n) - 3y(n-1) - 4y(n-2) = 0$$

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b) Consider the discrete time system shown in Fig. 1

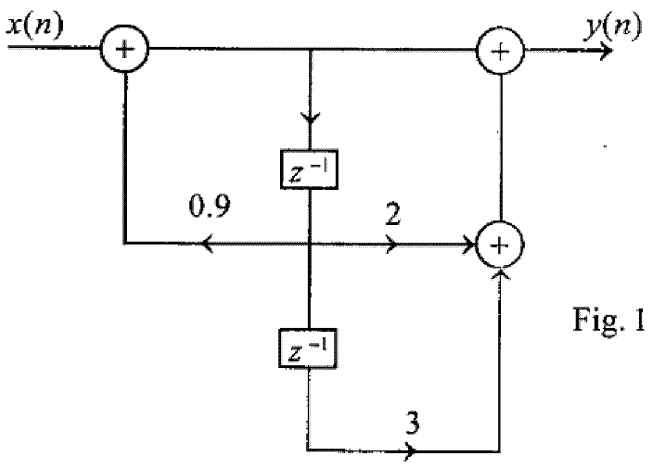

Fig. 1

i) Compute the first six values of the impulse response of the system. RGPVONLINE.COM

ii) Determine an analytical expression for the impulse response of the system.

3. a) Determine the response of the system $y(n)=\frac{5}{6}y(n-1)-\frac{1}{6}y(n-2)+x(n)$ to the input signal $x(n)=\delta(n)+\frac{1}{3}\delta(n-1)$.

b) A LTI system is characterized by the system function

$$H(z)=\frac{3-4z^{-1}}{1-3.5z^{-1}+1.5z^{-2}}.$$

Specify ROC of H(z) and determine h(n) for the following conditions

i) System is stable

ii) System is causal

iii) System is anticausal

4. Determine the causal signal $x(n)$ if its z transform is given by

a) $X(z)=\frac{1+2z^{-2}}{1+z^{-2}}$

b) $X(z)=\frac{1+6z^{-1}+z^{-2}}{4(1-2z^{-1}+2z^{-2})(1-0.5z^{-1})}$

c) $X(z)=\frac{z^{-6}+z^{-7}}{1-z^{-1}}$

5. Determine the N = 8point DFT using decimation in frequency. RGPVONLINE.COM

6. a) Explain the designing of FIR filter using Kaiser window.

b) Explain bilinear transformation method for designing of IIR filter.

7. a) Discuss the basic principle of spectrum estimation.

b) Explain briefly about multirate signal sampling

8. Write Short notes on any two of the following

a) Effect of finite register length in filter design

b) Wavelet Transform

c) Infinite invariance method

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