13/1/2013

Full mark=90marks

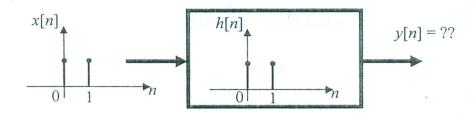
Time allowed: 3 hours

Q1. Cho	oose the correct answ	er		[6 Marks]
	signal e ^{-6t} u(t) is er signal	b) Energy signal	c) Neither Energy no	· Power .
1				
	signal x[n]={1,0,4,-2,0, er signal	9,9,-7,0,0,} is b) Energy signal	c) Neither Energy no	r Power
a) i owe	or signar	b) Lifetgy signal	c) Neither Energy no	T OWE!
	nput output relation y nory and Causal	'[n]=x[n+2]is b) Memory-less and Non-caus	al c) Memory and Non-	causal
Q2. Coi	mplete with the corre	ct answer		[10 Marks]
		1)-u(t+4)) is		
		t) is ne system with step response=(0		11
4. u(t+3)*u(t-2)=				
		r 4>t>0 is		
5. The	signal x(3t)of x(t)=t fo	r 4>t>0 is		
Q3				[30 marks]
a)	If a continuous time	LTI system is BIBO stable, then s	how that the ROC of its syste	m function
	H(s) must contain the	e imaginary axis jω.	1,00	in the second
b)	The output y(t) of a causal continuous time LTI system is found to be te ^{-t} u(t) when the			
	input $x(t)$ is $e^{-t}u(t)$. Using Laplace transform, find the system function $H(s)$, the impulse			
	response of the syste	em h(t) and the step response of	the system s(t).	
c)	Check the BIBO stabi	lity of the system function H(s)		
d)	Using Unilateral Lapl	ace transform, find the output o	f the system described by,	
	y''(t) - 0.5y'	(t) - 0.06y(t) = x(t)		
	•	y(0)=1, $y'(0)=1$ and $x(t)=3$	e ^{-2t} u(t).	
Q4				[30 marks]
a)	Find X(z) and its ROC	$x = (0.5)^n u[n] + (0.3)^n u[-n] = 0.5$	and y[n]=(0.5) ⁿ u[n-1] .	
b)	A finite sequence x[r	n]={2,3,-1,0,-1}; find X(z) and its	ROC.	

c) Using the power series expansion technique, find the inverse z transform of

$$X(z) = \frac{2z}{z - 0.5}$$
 $|z| < 0.5$

d) Use z transform to calculate the corresponding output y[n] for the input x[n]



e) A difference equation of a causal discrete LTI system is given by

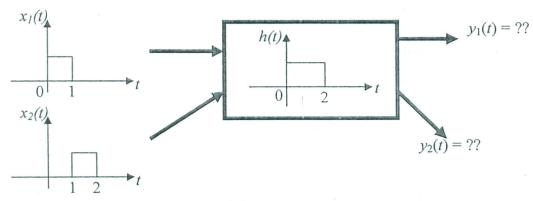
$$y[n-2]-2y[n-1]-3y[n]=x[n]$$

Using Z transform, find the system function H(z), the impulse response of the system h[n] and the step response of the system s[n]. check the BIBO stability of the system.

Question 5

[14 marks]

Evaluate the output of the following system using analytical and graphical techniques.



Good Luck

Dr. Nihal Fayez