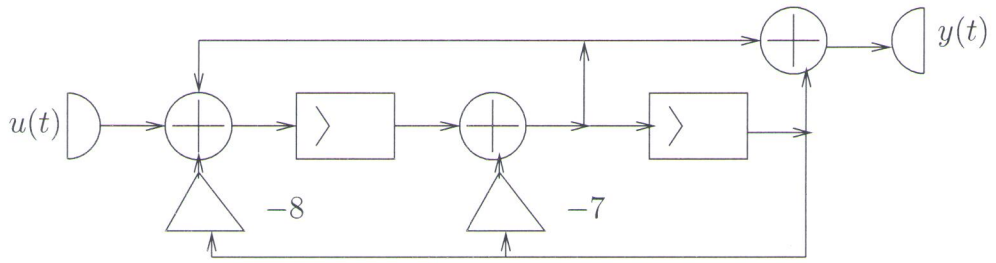
Signal and Systems(VIHV1214) 1^{st} test A *The date of the test*

Name:		Points	Corrector
Neptun code:	Problem:		
Signature:	Questions:		
	Sum:		

Problem. *(The solution must be written to a separate sheet of paper)*

The CT system is given with the following network.



(a) Give the state space description of the system in normal form! *(8 points)*
(b) Give the frequency response of the system if it exists or give explanation of your "the frequency response does not exist" answer! *(8 points)*
(c) Give the $g(t)$ step response value at the $t = +0$ moment and the constant component of the step response! (The step response is the system response to the $\varepsilon(t)$ input signal.) *(6 points)*
(d) Find the formula of the system impulse response! *(8 points)*

Questions. *The answer must be written under the text of the question! (2 points are given for each perfect response.)*

1. The impulse response of a DT system is given as: $h[k] = A\delta[k+1]+B\delta[k]+\varepsilon[k-1]C0,9^k$. At what values of the A, B and the C parameters is the system *a)* a causal one, *b)* a BIBO stable one?
   a) b)

2. The impulse response of a DT system is: $h[k] = 2\varepsilon[k]0,8^k$, the input signal is constant: $u[k] = 5$. Give the response value at the $k = 2$ stroke!
   $y[2] =$

3. The state variable description of a DT system is:
   $$x[k+1] = 0,5x[k] - u[k], \qquad y[k] = 5x[k] + 2u[k].$$
   Give the initial value of the system response if the input signal is: $u[k] = \varepsilon[k]10\cos(0,1\pi k)$!
   $y[0] =$

4. Give the complex amplitude of the $x[k] = 3\cos 0,1\pi k + 4\sin 0,1\pi k$ sinusoidal DT signal!
   $\overline{X} =$

5. The response of a BIBO stable DT system to the $u[k] = 5\cos(\frac{\pi}{2}k + 0,5)$ input signal is $y[k] = 4\cos(\frac{\pi}{2}k - 0,1)$. Give the transfer coefficient of the system at the discrete angular frequency of that signals!
   $\overline{H} =$