

1)

DIGITEL GYAK. 09.

04.27.

ZL
rész

1) lin. sz.

Emleztető: $\text{SNR}^{\text{dBS}} \approx 6n + 1 + 10 \lg \frac{x_{\text{max}}^2}{C^2}$



Stimulus: 1.8
 Kérvettség: -
 Egységlet: 1.0

a) $C = x_{\text{max}}$

$\text{SNR}_1^{\text{dBS}} = 6n \sqrt{6}$



b) $C = 2x_{\text{max}}$

$\text{SNR}^{\text{dBS}} = 6n + 10 \lg \frac{1}{4}$

c) $x = x_1 + x_2$



teljesítmény $\checkmark$
 $\text{SNR} \downarrow \downarrow$

2) $y(n) - \alpha y(n-1) = \frac{1}{4} x(n) - \frac{1}{4} x(n-4)$

a) $\alpha = ? \rightarrow \text{BIBO stabil}$

rec. IIR (a nem megvalósítható IIR a nem rekurzív)

$\alpha = 1$ -nél
 FIR

$$\left. \begin{array}{l} |p_i| < 1 \\ |r_i| < 1 \end{array} \right\} \rightarrow |\alpha| \leq 1$$

b) $x=1$ $h(n)=?$ időtartomány v z -trafó

I) időtartomány

$$x(n) = \delta(n) \quad N=1 \quad y(-1)=0$$

$$N=4$$

homogén

$$n \geq M+1-5$$

$$y(n) - y(n-1) = 0$$

$$y - 1 = 0$$

$$A = 1$$

$$h(n) = C$$

C együttható meghatározása

$$n \geq M+1 - N = 4$$

$$y(0) = 1/4 \quad y(3) = 1/4$$

$$y(1) = 1/4 \quad y(4) = 0 = C$$

$$y(2) = 1/4 \quad y(5) = 0$$

$$h(n) = \frac{1}{4} \delta(n) + \frac{1}{4} \delta(n-1) + \frac{1}{4} \delta(n-2) + \frac{1}{4} \delta(n-3)$$

$$\underline{h} = \begin{bmatrix} 1/4 & 1/4 & 1/4 & 1/4 \end{bmatrix}$$

↑

FR len

II) z -trafóval

$$Y(z) - z^{-1} Y(z) = \frac{1}{4} X(z) - \frac{1}{4} z^{-4} X(z)$$

$$H(z) = \frac{Y(z)}{X(z)} = \frac{1}{4} \cdot \frac{1-z^{-4}}{1-z^{-1}}$$

$$h(n) = z^{-1} \{ H(z) \}$$

$$1) h(n) = z^{-1} \left\{ \frac{1}{4} \cdot \frac{1}{1-z^{-1}} - \frac{1}{4} z^{-4} \frac{1}{1-z^{-1}} \right\}$$

$$= \frac{1}{4} [h(n) - h(n-4)]$$

$$2) a^2 - b^2 = (a-b)(a+b)$$

$$h(z) = z^{-1} \left\{ \frac{1}{4} \frac{(1-z^{-1})(1+z^{-1})(1+z^{-2})}{1-z^{-1}} \right\} =$$

$$= z^{-1} \left\{ \frac{1}{4} (1+z^{-1}+z^{-2}+z^{-3}) \right\} =$$

$$= \frac{1}{4} \delta(n) + \frac{1}{4} \delta(n-1) + \frac{1}{4} \delta(n-2) + \frac{1}{4} \delta(n-3)$$

$$3) 1-z^{-4} = 1-z^{-1} = 1+z^{-1}+z^{-2}+z^{-3}$$

$$z^{-1} - z^{-4}$$

$$z^{-2} - z^{-5}$$

$$z^{-3} - z^{-6}$$

$$z^n - z^{-4} = 0$$

$$h(n) = z^{-1} \left\{ \frac{1}{4} (1+z^{-1}+z^{-2}+z^{-3}) \right\} = \dots$$

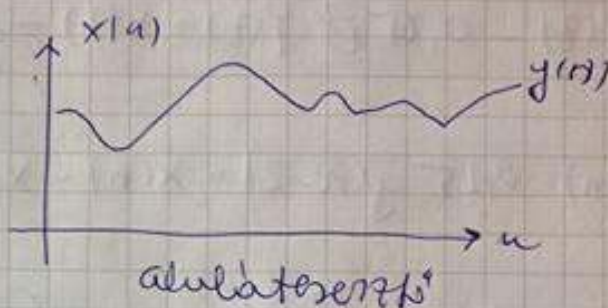
2)

DIGITEL BÜRE 09.

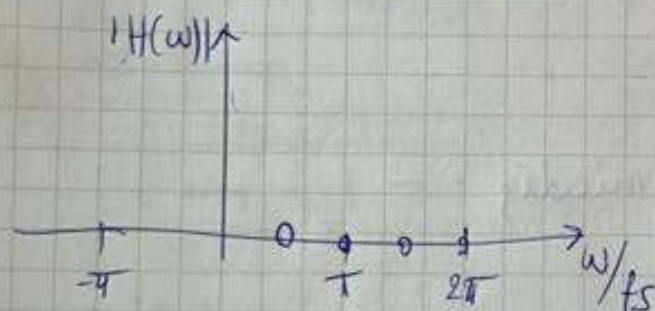
09.27.

$$c) x(n) = [1 \ 2 \ 3 \ 4 \ 5]$$

$$y(n) = ? \quad \underline{L} \times \underline{x}$$

Intuicivó

Milyen jellegű egy művelet? $\rightarrow |H(\omega)|$ - + vizsgálguk.



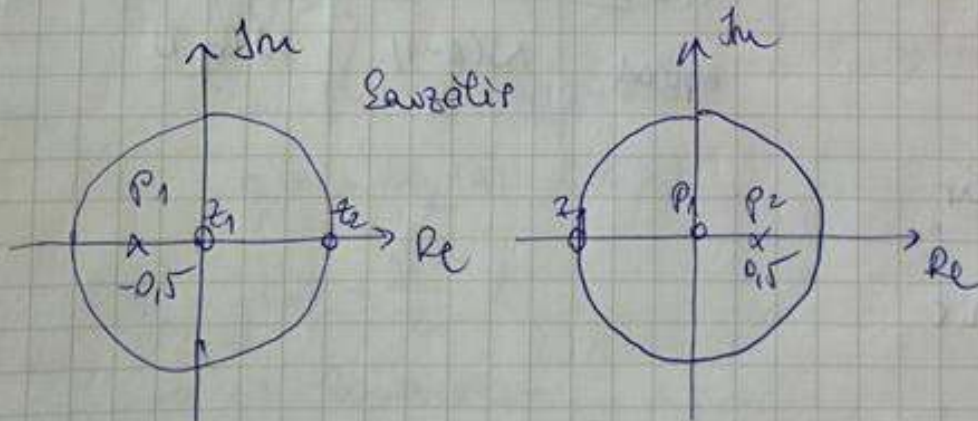
$$H(\omega) = \frac{1}{4} (1 + e^{-j\omega} + e^{-j2\omega} + e^{-j3\omega})$$

$$\text{DFT} \quad N=4 \rightarrow \frac{2\pi}{4} = \frac{\pi}{2}$$

$$X = \underline{\underline{W}} \begin{bmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

alul

3)



$$a) H(z) = H_1(z) H_2(z) = \frac{z(z-1)}{z+0.5} \cdot \frac{z+1}{z(z-0.5)} = \frac{z^2-1}{z^2-0.125}$$

$$\text{LoC} : |z| > 0.5$$

$$b) \quad H(z) = \frac{Y(z)}{X(z)} = \frac{1 - z^{-2}}{1 - 0,5z^{-2}}$$

$$z^{-2} \left\{ \begin{aligned} Y(z) - 0,25z^{-2} Y(z) &= X(z) - z^{-2} X(z) \\ y(n) - 0,25 y(n-2) &= x(n) - x(n-2) \end{aligned} \right.$$

$$h(n) = h(n) \delta(n) + u(n-1) [C_1 \cdot 0,5^n + C_2 (-0,5)^n]$$

c) Blockdiagram

4) a) ε_n differetiel pel mindig. —

Hamis

b) $n = 2$

~~Hamis~~

Igaz

	DFT ^{m-v}	FFT ^{reduk=2}
komplex forrás	N^2 $\sim 10^6$	$\frac{N}{2} \log_2 N$ ~ 5000
örlérad	$N(N-1)$	$N \log_2 N$

c) Hamis

d) Hamis