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① k

a) $y(n) + y(n-1) = u(n)$, $u(n) = \cos\left(\frac{\pi}{2} n\right) \mu(n)$

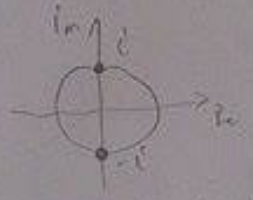
$c z^n + c z^{n-2} = 0 \quad / \cdot z^n$

$1 + \frac{1}{z^2} = 0 \quad / \cdot z^2$

$z^2 + 1 = 0$

$z^2 = -1$

$z = \pm j$



- sustav je granično stabilan

$|z| = 1$

Odziv na step

$u(n) = \mu(n)$

$y_h(n) = \frac{c}{2} e^{j\Theta} (j)^n + \frac{c}{2} e^{-j\Theta} (-j)^n$

Impulsni $u(n) = \delta(n)$

$h(0) + h(-2) = 1$

$h(1) + h(-1) = 0 \Rightarrow h(2) = 0$

$h(0) = 1 = c \cos\Theta$

$h(1) = 0 = c \cos\left(\frac{\pi}{2} + \Theta\right)$ ⇒ iz toga zaključujemo da je $\Theta = 0$ a $c = 1$

$h(n) = \left[\cos\left(\frac{n\pi}{2}\right)\right] \mu(n)$

1. k 2

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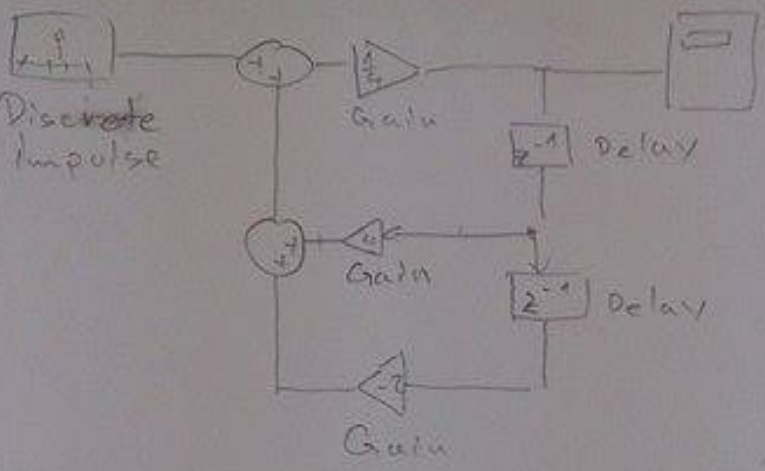
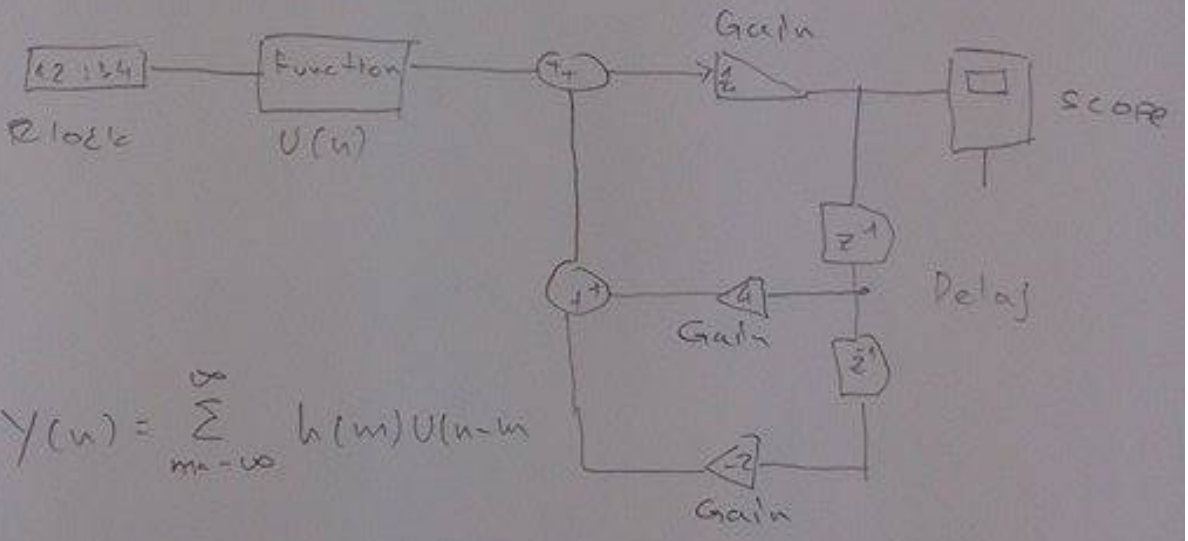


Za odziv na step umjesto discrete impul
stavimo step



$$Y(n) = \sum_{m=-\infty}^{\infty} h(m)\,U(n-m)$$

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Odziv na stepenicu $u(n) = \mu(n)$

$$y_p(n) = K$$

$$K + K = 1 \Rightarrow K = \frac{1}{2}$$

$$y(n) = C \cos\left(\frac{n\pi}{2} + \Theta\right) + \frac{1}{2}$$

$$y(0) = 1 = C\cos(\Theta) + \frac{1}{2}$$

$$y(1) = 1 = C\cos\left(\frac{\pi}{2} + \Theta\right) + \frac{1}{2}$$

$$1 = \frac{\cos\Theta}{\cos\left(\Theta + \frac{\pi}{2}\right)} = -\frac{\cos\Theta}{\sin\Theta} = -ctg(\Theta)$$

$$\Theta 1 = ctg(\Theta) \Rightarrow \boxed{\Theta = -\frac{\pi}{4}}$$

$$\frac{1}{2} = C\frac{\sqrt{2}}{2} \Rightarrow \boxed{C = \frac{\sqrt{2}}{2}}$$

$$y(n) = \left[\frac{\sqrt{2}}{2}\cos\left(\frac{n\pi}{2} - \frac{\pi}{4}\right) + \frac{1}{2}\right]\mu(n)$$

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1. k 2

1 k 3)

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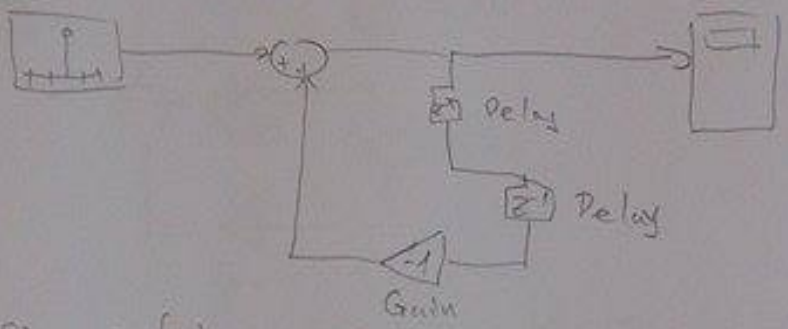
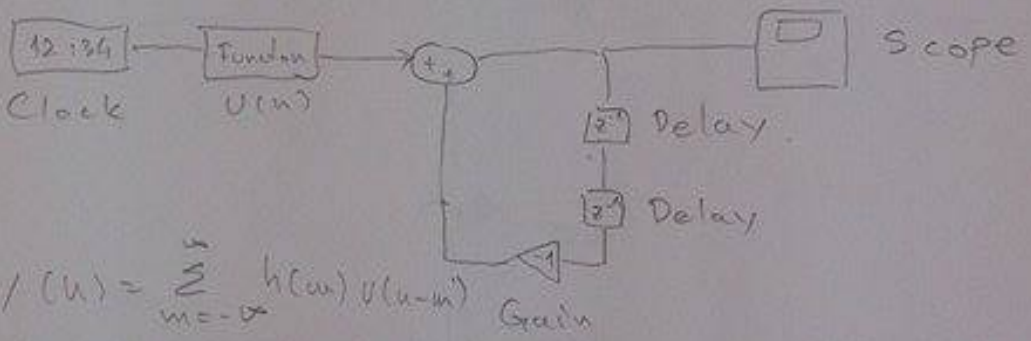


Za odziv na stepenicu umjesto discrete impulse stavimo step



$$y(n) = \sum_{m=-\infty}^{\infty} h(m)\, u(n-m)$$