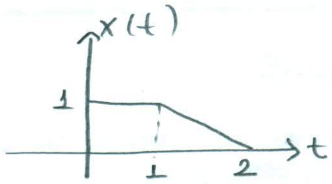
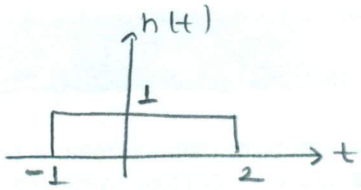
# İşaretler ve Sistemler Vize Çözümler (15.11.2016)

3)




$$y(t)=\int_{-\infty}^{\infty} x(\tau)\,h(t-\tau)\,d\tau$$

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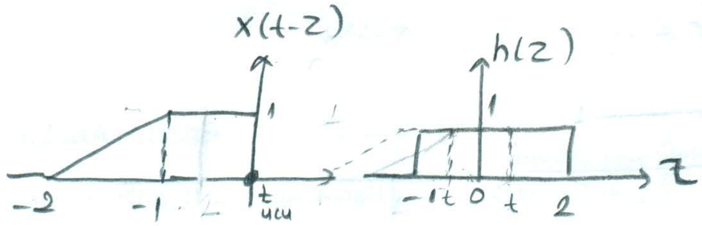
$$y(t)=\int_{-\infty}^{\infty} h(\tau)\,x(t-\tau)\,d\tau .$$

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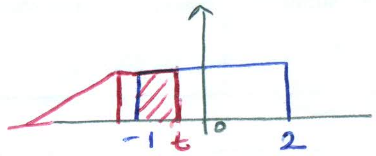
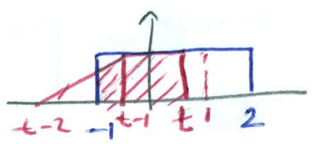
$y(t)=0 \quad , \quad t<-1$

$$y(t)=\int_{-1}^{t} h(\tau)\,x(t-\tau)\,d\tau=\int_{-1}^{t} 1.1\,d\tau=t+1 \quad , \quad -1\le t<0$$



$$y(t)=\int_{t-1}^{t} \underbrace{h(\tau)}_{1}\,\underbrace{x(t-\tau)}_{1}\,d\tau+\int_{-1}^{t-1} 1.\,2(t-\tau)\,d\tau \quad , \quad 0\le t\le 1$$



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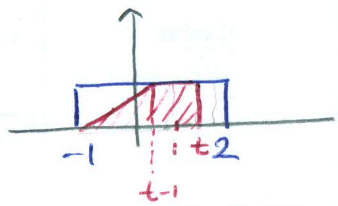
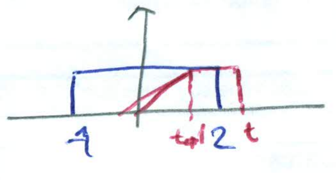
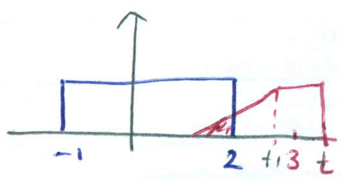
$$y(t)=\int_{t-1}^{t} 1.1.\,d\tau+\int_{t-2}^{t-1} 1.2(t-\tau)\,d\tau \quad , \quad 1\le t\le 2$$



$$y(t)=\int_{t-1}^{2} 1\,d\tau+\int_{t-2}^{t-1} 2.(t-\tau)\,d\tau \quad , \quad 2\le t\le 3$$

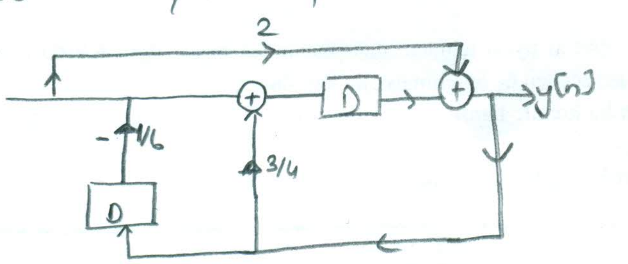


$$y(t)=\int_{t-2}^{2} 2.(t-\tau)\,d\tau \quad , \quad 3\le t\le 4$$



$y(t)=0 \quad , \quad t>4$

4) a) 15




$$y[n]=\frac{3}{4}y[n-1]-\frac{1}{6}y[n-2]+2x[n]$$

Sistem nedensel, kararlı, hafızasızdır.

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b) $y(t)=\iint x(t)dt-\frac{4}{3}\iint y(t)dt-\frac{1}{3}\int y(t)dt$

$$\frac{d^2y(t)}{dt^2}+\frac{1}{3}\frac{dy(t)}{dt}+\frac{4}{3}y(t)=x(t)$$

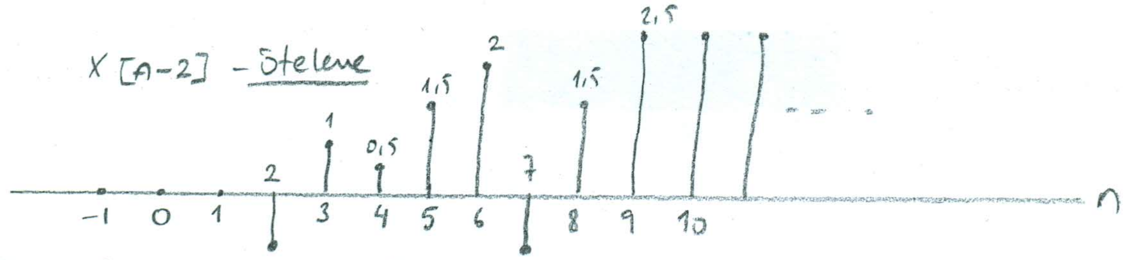
Nedensel, kararlı ve hafızalıdır.

Vize Çözüm 15.11.2016

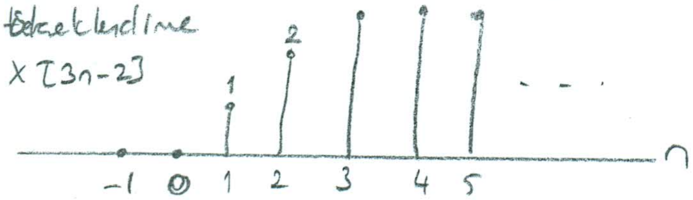
C.1 $x_1[n] = -\delta[n] + x[-3n-2]$

- Önce $x[-3n-2]$ yi elde edelim. (Öteleme, Ölçeklendirme, Tersleme

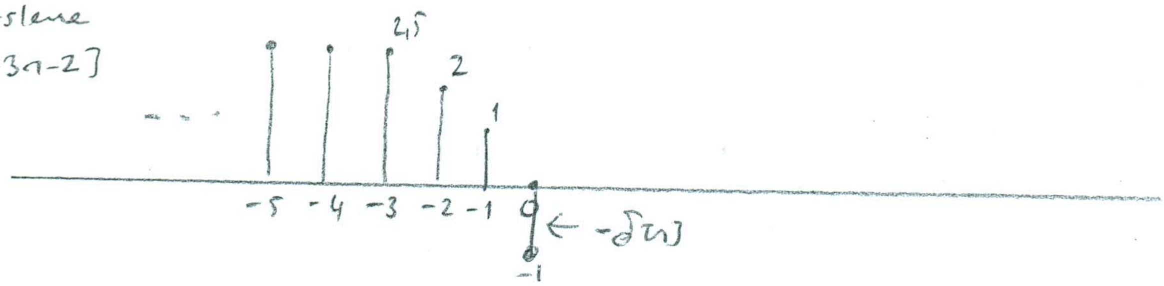
$x[n-2]$ - Öteleme




Ölçeklendirme
$x[3n-2]$




Tersleme
$x[-3n-2]$




C.2 $x(t) = \sum_{k=-\infty}^{\infty} a_k e^{jk w_0 t}$ , $|a_k|$ ve $\angle a_k$ grafiğinden faydalanarak;

$$x(t) = \underbrace{\underset{k=1}{1.e^{j w_0 t}} + \underset{k=-1}{1.e^{-j w_0 t}}} + \underbrace{\underset{k=3}{\frac{1}{6} e^{j\theta} \cdot e^{j3w_0 t}} + \underset{k=-3}{\frac{1}{6} e^{-j\theta} e^{-j3w_0 t}}} + \underbrace{\underset{k=5}{\frac{1}{10} e^{-j\phi} e^{j5w_0 t}} + \underset{k=-5}{\frac{1}{10} e^{j\phi} e^{-j5w_0 t}}}$$

$$x(t) = 2\left(\frac{e^{jw_0 t} + e^{-jw_0 t}}{2}\right) + \frac{2}{6}\left(\frac{e^{j(3w_0 t+\theta)} + e^{-j(3w_0 t+\theta)}}{2}\right) + \frac{2}{10}\left(\frac{e^{j(5w_0 t-\phi)} + e^{-j(5w_0 t-\phi)}}{2}\right)$$

$$x(t) = 2\cos w_0 t + \frac{1}{3}\cos(3w_0 t + \theta) + \frac{1}{5}\cos(5w_0 t - \phi)$$