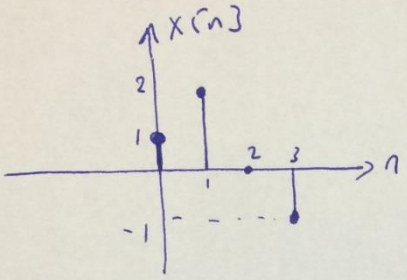
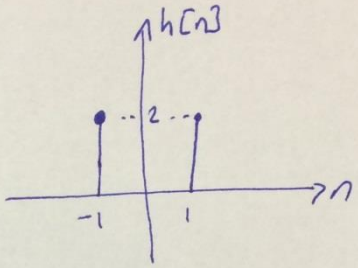
Örnek:

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

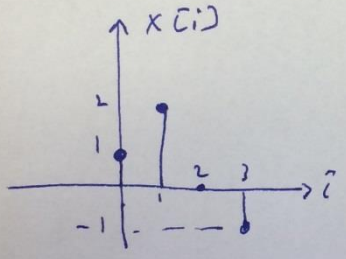
$h[n] = 2\delta[n+1] + 2\delta[n-1]$

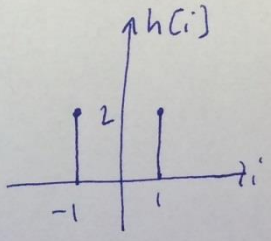
$y[n] = x[n] * h[n]$

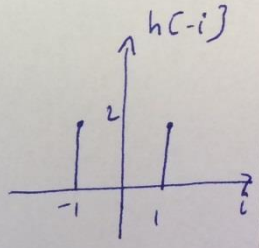


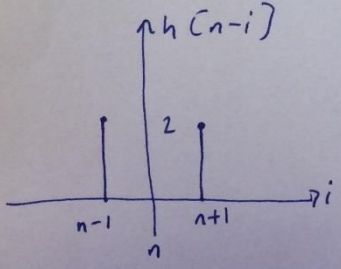


$$y[n] = \sum_{i=-\infty}^{\infty} x[i]\, h[n-i]$$





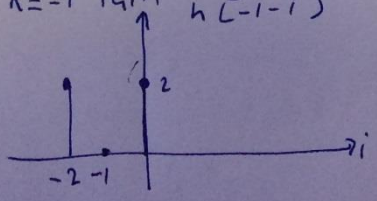




$n+1 < 0$

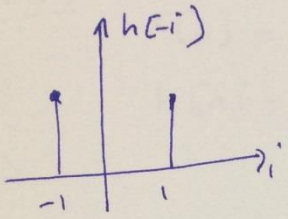
$n < -1$ için $y[n] = 0$

$n = -1$ için $h[-1-i]$



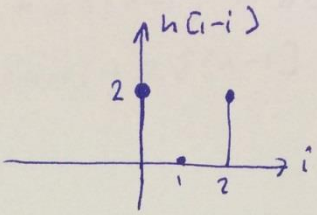
$y[-1] = 2 \times 1 = 2$

$n=0$ için



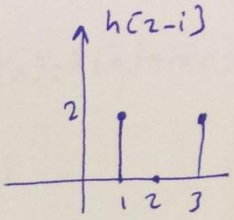
$y[0] = 2 \times 2 = 4$

$n=1$ için



$y[1] = 2 \times 1 = 2$

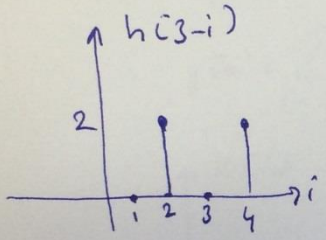
$n=2$ için



$y[2] = 2 \times (-1) + 2 \times 2$

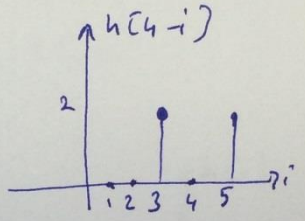
$y[2] = 2$

$n=3$ için



$y[3] = 0$

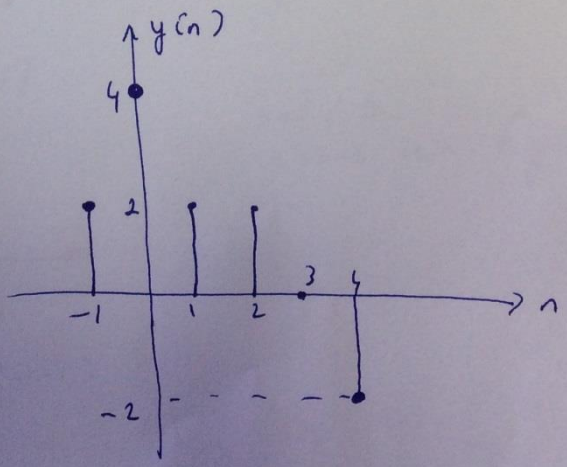
$n=4$ için



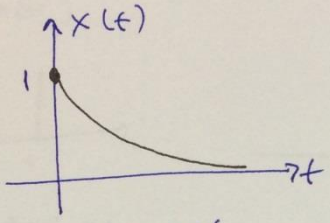
$y[4] = 2 \times (-1) = -2$

$n > 4$ için

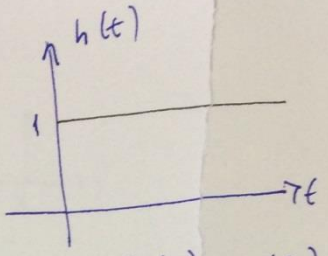
$\forall y[n] = 0$



Örnek:

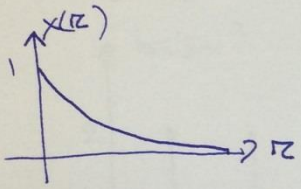


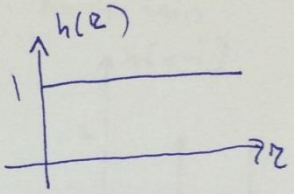
$x(t) = e^{-at}u(t)$

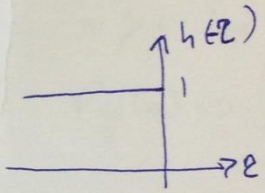


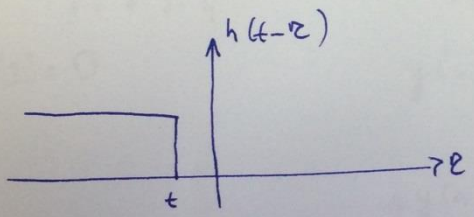
$h(t) = u(t)$

$$y(t) = x(t) * h(t)$$





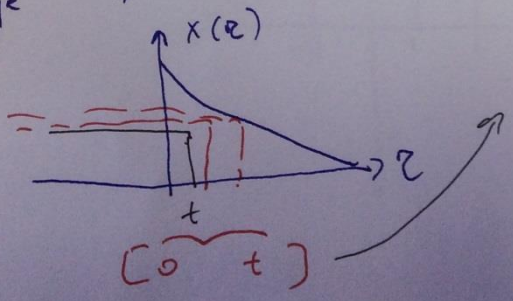




1. Bölge $t < 0$ için $y(t) = \int x(\tau) \cdot h(t-\tau)\, d\tau$

$\forall t$ için $y(t) = 0$

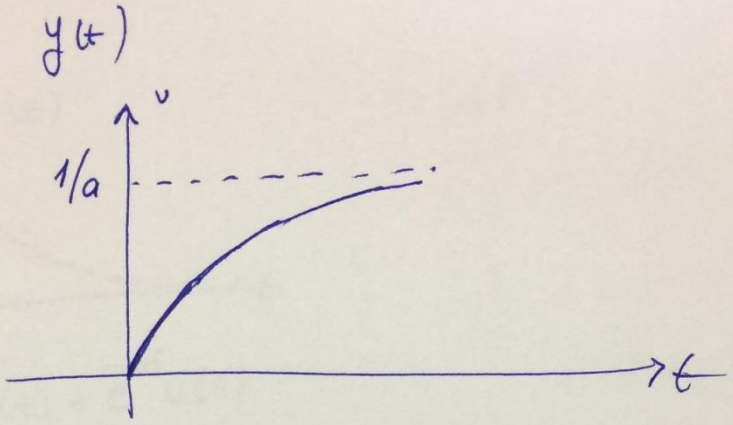
2. Bölge $t \geq 0$ için



$$y(t) = \int_0^t e^{-a\tau} \cdot (1) \cdot d\tau$$

$$= -\frac{1}{a} e^{-a\tau} \Big|_0^t$$

$$= \frac{1}{a}\left(1 - e^{-at}\right)$$


y(t)
v
1/a
t

Örnek:

$x(t) = 1 + \sin(\omega_0 t) + 2\cos(\omega_0 t) + \cos(2\omega_0 t + \pi/4)$

Temel frekans ω_0

Fourier Seri açılımını bulun.

$$x(t) = 1 + \frac{1}{2j}\left(e^{j\omega_0 t} - e^{-j\omega_0 t}\right) + \left(e^{j\omega_0 t} + e^{-j\omega_0 t}\right) + \frac{1}{2}\left(e^{j(2\omega_0 t + \pi/4)} + e^{-j(2\omega_0 t + \pi/4)}\right)$$

$$x(t) = \underbrace{1}_{C_0} + \underbrace{\left(1 + \frac{1}{2j}\right)}_{C_1} e^{j\omega_0 t} + \underbrace{\left(1 - \frac{1}{2j}\right)}_{C_{-1}} e^{-j\omega_0 t} + \underbrace{\frac{1}{2}e^{j\pi/4}}_{C_2} \cdot e^{j2\omega_0 t} + \underbrace{\frac{1}{2}e^{-j\pi/4}}_{C_{-2}} \cdot e^{-j2\omega_0 t}$$

$C_0 = 1 \qquad C_1 = 1 + \frac{1}{2j} \qquad C_{-1} = 1 - \frac{1}{2j} \qquad C_2 = \frac{\sqrt{2}}{4}(1+j) \qquad C_{-2} = \frac{\sqrt{2}}{4}(1-j)$