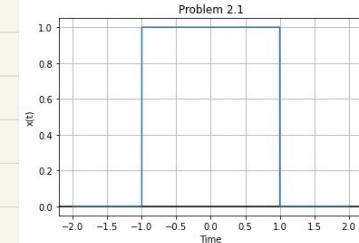
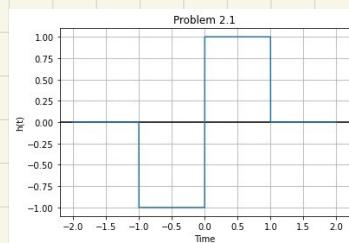


2.1) නැග $x(t)$ නිවුත්

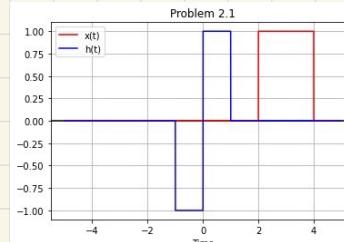
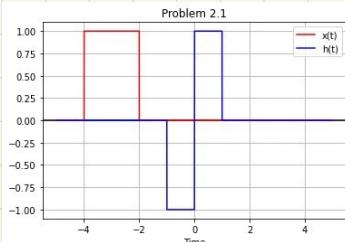


නැග h(t) නිවුත්



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

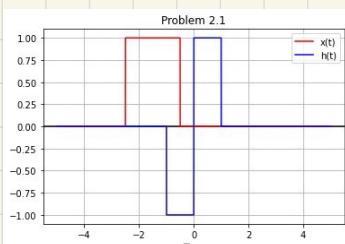
නෙත් $t < -2$ යටුව නෑ



දැන් $x(t-\tau) h(\tau)$ නෑ

$$\int_{-\infty}^{\infty} x(t-\tau) h(\tau) d\tau = 0$$

නෙත් $-2 \leq t < -1$

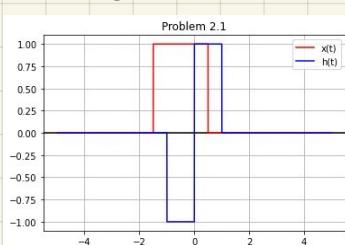


$$\int_{-1}^{t+1} x(t-\tau) h(\tau) d\tau = \int_{-1}^{t+1} (1)(-1) d\tau$$

$$= -\tau \Big|_{-1}^{t+1} = -t-1 = -t-2$$

$$\therefore \int_{-\infty}^{\infty} x(t-\tau) h(\tau) d\tau = -t-2$$

නෙත් $-1 \leq t < 0$

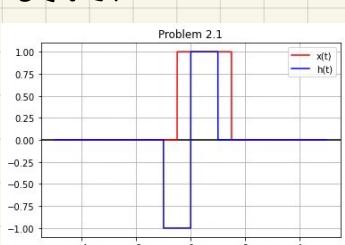


$$\int_{-1}^0 x(t-\tau) h(\tau) d\tau + \int_0^{t+1} x(t-\tau) h(\tau) d\tau = \int_{-1}^0 (1)(-1) d\tau + \int_0^{t+1} (1)(1) d\tau$$

$$= -\tau \Big|_{-1}^0 + \tau \Big|_0^{t+1} = -1+t-1 = t$$

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

නෙත් $0 \leq t < 1$

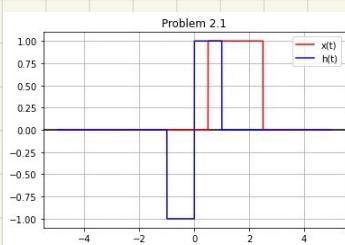


$$\int_{t-1}^0 x(t-\tau) h(\tau) d\tau + \int_0^1 x(t-\tau) h(\tau) d\tau = \int_{t-1}^0 (1)(-1) d\tau + \int_0^1 (1)(1) d\tau$$

$$= -\tau \Big|_{t-1}^0 + \tau \Big|_0^1 = t-1+1 = t$$

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

නෙත් $1 \leq t < 2$



$$\int_{t-1}^1 x(t-\tau) h(\tau) d\tau = \int_{t-1}^1 (1)(1) d\tau$$

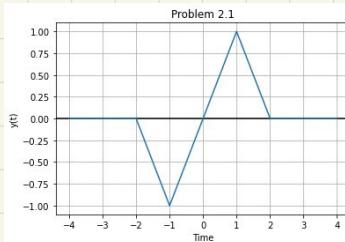
$$= \tau \Big|_{t-1}^1 = 1-t+1 = 2-t$$

$$\therefore \int_{-\infty}^{\infty} x(t-\tau) h(\tau) d\tau = 2-t$$

ශ්‍රී ප්‍රජාතන්ත්‍රික සමාජ ව්‍යවසාය

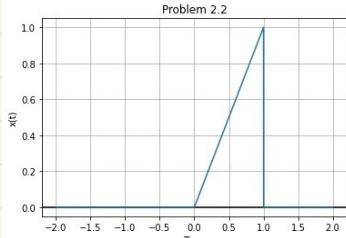
$$y(t) = \begin{cases} 0 & , t < -2 \\ -t-2 & , -2 \leq t < -1 \\ t & , -1 \leq t < 1 \\ 2-t & , 1 \leq t < 2 \\ 0 & , t \geq 2 \end{cases}$$

ක්‍රියාකෘතිය පිළිබඳ පිටපත

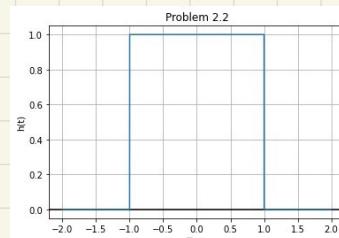


✗

2.1) පැහැදිලි පිටපත

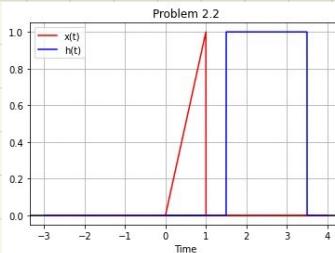
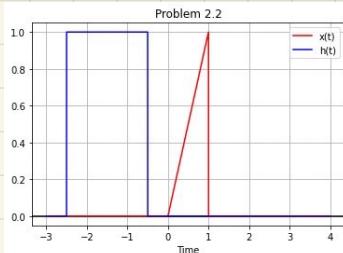


වෙතින් නොවූ



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

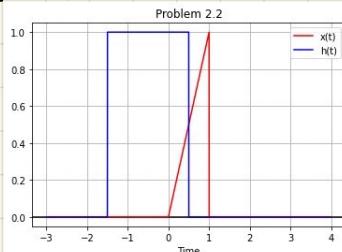
නෙකුත් $t < -1$ ඇත්තේ $x(t) = 0$



ඒනිදි $x(\tau)$ හෝ $h(t-\tau)$ තුළ මෙහෙයුම් ස්ථාන තුළ ඇති නොවූ

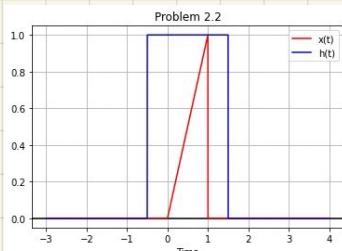
$$\therefore \int_{-\infty}^{\infty} x(\tau) h(t-\tau) d\tau = 0$$

නෙකුත් $-1 \leq t < 0$



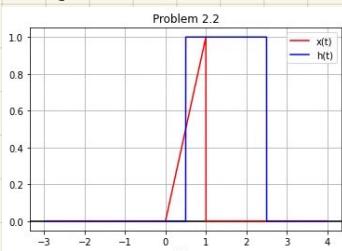
$$\begin{aligned} \int_0^{t+1} x(\tau) h(t-\tau) d\tau &= \int_0^{t+1} (\tau)(1) d\tau \\ &= \frac{\tau^2}{2} \Big|_0^{t+1} = \frac{(t+1)^2}{2} \\ \therefore \int_{-\infty}^{\infty} x(\tau) h(t-\tau) d\tau &= (t+1)^2/2 \end{aligned}$$

නෙකුත් $0 \leq t < 1$



$$\begin{aligned} \int_0^1 x(\tau) h(t-\tau) d\tau &= \int_0^1 (\tau)(1) d\tau \\ &= \frac{\tau^2}{2} \Big|_0^1 = 1/2 \\ \therefore \int_{-\infty}^{\infty} x(\tau) h(t-\tau) d\tau &= 1/2 \end{aligned}$$

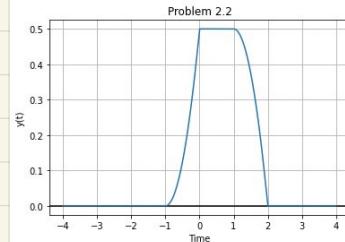
නෙකුත් $1 \leq t < 2$



$$\begin{aligned} \int_{t-1}^1 x(\tau) h(t-\tau) d\tau &= \int_{t-1}^1 (\tau)(1) d\tau \\ &= \frac{\tau^2}{2} \Big|_{t-1}^1 = \frac{1}{2} - \frac{(t-1)^2}{2} = \frac{2t-t^2}{2} \\ \therefore \int_{-\infty}^{\infty} x(\tau) h(t-\tau) d\tau &= (2t-t^2)/2 \end{aligned}$$

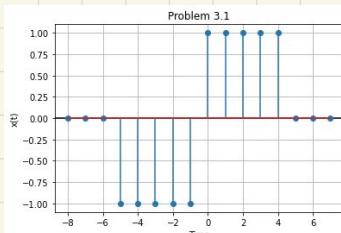
ទេរក្រុងកន្លែងខាងក្រោម

$$y(t) = \begin{cases} 0 & , t < -1 \\ (t+1)^2/2 & , -1 \leq t < 0 \\ 1/2 & , 0 \leq t < 1 \\ (2t-t^2)/2 & , 1 \leq t < 2 \\ 0 & , 2 \leq t \end{cases}$$

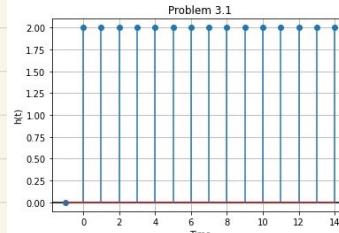


2

3.1) จาก $x[n]$ คือ



ໄລສ: $h[n]$ ຄົວ

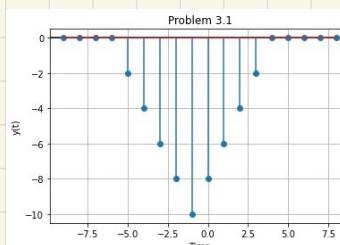


95 Tabular method

The diagram illustrates the convolution process between the input signal $x[n]$ and the filter $h[n]$. The input $x[n]$ is a sequence of values: $-1, -1, -1, -1, -1, 1, 1, 1, 1, 1, \dots$. The filter $h[n]$ is a sequence of values: $2, -2, 2, -2, 2, -2, 2, -2, 2, -2, \dots$. The output $y[n]$ is a sequence of zeros: $0, 0, 0, 0, 0, 0, 0, 0, 0, 0, \dots$.

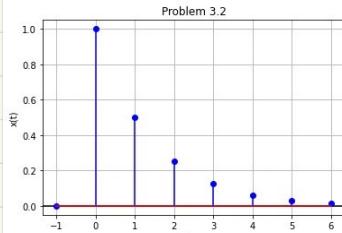
The convolution is performed by sliding the filter $h[n]$ over the input $x[n]$. The filter $h[n]$ is shown at various positions above the input $x[n]$, with its values highlighted in red, orange, yellow, and green. The output $y[n]$ is shown below the input $x[n]$, with its values highlighted in blue.

គំនិតភាពការងារ និង plot graph ។

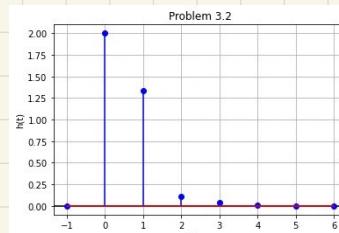


卷

3.2) จาก x[te] คือ



ແລະ $h[n]$ ຄົວ



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

$$= \sum_{k=-\infty}^{\infty} \left(\left(\frac{1}{2}\right)^k u(k) \right) (\delta[n-k] + \delta[n-1-k] + \left(\frac{1}{3}\right)^{n-k} u(n-k))$$

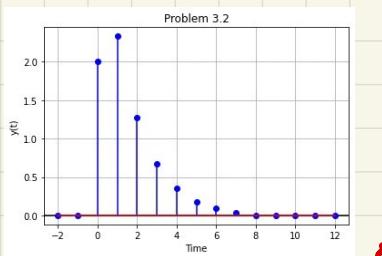
$$= \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^k u[k] \delta[n-k] + \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^k u[k] \delta[n-1-k] + \sum_{k=-\infty}^{\infty} \left(\frac{1}{2}\right)^k u[k] \left(\frac{1}{3}\right)^{n-k} u[n-k]$$

$$= \frac{u[n]}{2^n} + \frac{u[n-1]}{2^{n-1}} + \frac{1}{3^n} \left(\sum_{k=0}^n \left(\frac{3}{2}\right)^k \right) u[n]$$

6332009521 සිංහල තීරණ ආකෘතියක්

$$y[n] = \frac{u[n]}{2^n} + \frac{u[n-1]}{3^{n-1}} + \frac{1}{3^n} \left(\frac{(3/2)^{n+1} - 1}{3/2 - 1} \right) u[n] = \begin{cases} 2 & , n=0 \\ \frac{6}{2^n} - \frac{2}{3^n} & , n \neq 0 \end{cases}$$

කේසාංක්‍රීත පුරුෂ ප්‍රතිච්‍රිත ප්‍රතිච්‍රිත ප්‍රතිච්‍රිත



X