

Labsol Konvolusi:

$x(n_1, n_2)$

1	4	1
2	5	3

$h(n_1, n_2)$

1	1
1	-1

$$g(n_1, n_2) = \sum_{k_1=-\infty}^{\infty} \sum_{k_2=-\infty}^{\infty} x(k_1, k_2) h(n_1 - k_1, n_2 - k_2)$$

Step 1: $h(n_1, n_2)$ dicermatikan terhadap origin sehingga didapatkan

1	4	1
2	5	3

-1	1
1	1

$$\begin{pmatrix} \bullet \begin{array}{ccc} -1 & 1 & \\ & 1 & 1 \end{array} \rightarrow -1(0) + (2) = 2 \\ \bullet \begin{array}{ccc} -1 & 4 & 1 \\ & 1 & 1 \end{array} \rightarrow -1(2) + 5 = 3 \\ \bullet \begin{array}{ccc} 1 & 4 & 1 \\ 2 & (-1) & (-5) \end{array} \rightarrow -5 + 3 = -2 \\ \bullet \begin{array}{ccc} 1 & 4 & 1 \\ 2 & 5 & (-1) \end{array} \rightarrow -3 + 1(0) = -3 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \\ -2 \\ -3 \end{pmatrix}$$

$$\begin{pmatrix} \bullet \begin{array}{ccc} -1 & 4 & 1 \\ & 1 & 2 \end{array} \rightarrow 1(1) + 1(2) = 3 \\ \bullet \begin{array}{ccc} -1 & 1 & 1 \\ & 1 & 4 \end{array} \rightarrow -1 + 4 + 2 + 5 = 10 \\ \bullet \begin{array}{ccc} 1 & 4 & 1 \\ 2 & 1 & 5 \end{array} \rightarrow -4 + 1 + 5 + 3 = 5 \\ \bullet \begin{array}{ccc} 1 & 4 & (-1) \\ 2 & 5 & (-1) \end{array} \rightarrow -1 + 3 + 0 = 2 \end{pmatrix} \begin{pmatrix} 3 \\ 10 \\ 5 \\ 2 \end{pmatrix}$$

$$g(n_1, n_2) = \begin{pmatrix} 1 & 5 & 5 & 1 \\ 3 & 10 & 5 & 2 \\ 2 & 1 & -2 & -3 \end{pmatrix}$$

$$\begin{pmatrix} \bullet \begin{array}{ccc} -1 & 1 & \\ & 1 & 4 \end{array} \rightarrow 1 \\ \bullet \begin{array}{ccc} 1 & 1 & 1 \\ 2 & 5 & 3 \end{array} \rightarrow 1 + 4 = 5 \\ \bullet \begin{array}{ccc} 1 & 1 & 1 \\ 2 & 5 & 3 \end{array} \rightarrow 1 + 1 = 3 \\ \bullet \begin{array}{ccc} 1 & 4 & 1 \\ 2 & 5 & 2 \end{array} \rightarrow 1 \end{pmatrix} \begin{pmatrix} 1 \\ 5 \\ 3 \\ 1 \end{pmatrix}$$