

Latihan Soal Convulasi 2D .

$x(n_1, n_2)$

1 4 1
2 5 3

* *

$h(n_1, n_2)$

1 1
1 -1

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

① Mencerminkan $h(n_1, n_2)$ terhadap origin

-1 1
1 1

Sehingga konvolusi sinyal :

1 4 1

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

1 4 1

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

1 4 1

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

1 4 1

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

$$\begin{array}{r} * \quad -1 \quad (1.1) \quad 4 \quad 1 \\ \quad \quad 1 \quad (1.2) \quad 5 \quad 3 \end{array} \Rightarrow 1(1) + 1(2) = 3$$

$$\begin{array}{r} * \quad (-1.1) \quad (1.4) \quad 1 \\ \quad \quad (1.2) \quad (1.5) \quad 3 \end{array} \Rightarrow -1 + 4 + 2 + 5 = 10$$

$$\begin{array}{r} * \quad 1 \quad (-1.4) \quad (1.1) \\ \quad \quad 2 \quad (1.5) \quad (1.3) \end{array} \Rightarrow -4 + 1 + 5 + 3 = 5$$

$$\begin{array}{r} * \quad 1 \quad 4 \quad (-1.1) \quad 1 \\ \quad \quad 2 \quad 5 \quad (1.3) \quad 1 \end{array} \Rightarrow -1 + 3 + 0 + 0 = 2$$

$$\begin{array}{r} \bullet \quad -1 \quad 1 \\ \quad \quad 1 \quad (1.1) \quad 4 \quad 1 \\ \quad \quad \quad 2 \quad 5 \quad 3 \end{array} \Rightarrow 1$$

$$\begin{array}{r} \bullet \quad -1 \quad 1 \\ \quad \quad (1.1) \quad (4.1) \quad 1 \\ \quad \quad \quad 2 \quad 5 \quad 3 \end{array} \Rightarrow 1 + 4 = 5$$

$$\begin{array}{r} \bullet \quad -1 \quad 1 \\ \quad \quad 1 \quad (1.4) \quad (1.1) \\ \quad \quad \quad 2 \quad 5 \quad 3 \end{array} \Rightarrow 4 + 1 = 5$$

$$\begin{array}{r} \bullet \quad -1 \quad 1 \\ \quad \quad 1 \quad 4 \quad (1.4) \quad 1 \\ \quad \quad \quad 2 \quad 5 \quad 3 \end{array} \Rightarrow 4$$

$\hookrightarrow g(n_1, n_2) =$

1	5	5	4
3	10	5	2
2	3	-2	-3