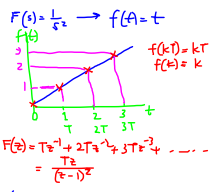


Contoh



Contoh (tanpa Laplace)

Diketahui sebuah isyarat, cuplikat

k	x(k)
0	2
1	0
2	2
3	0
4	2
>4	0

Tentukan $X(z) = \sum x(k)$!

$$\begin{aligned} X(z) &= \sum_{k=0}^{\infty} z^{-k} x(k) = z^{-0} \cdot x(0) + z^{-1} x(1) + z^{-2} x(2) + z^{-3} x(3) + z^{-4} x(4) \\ &= 1 \cdot 2 + z^{-1} \cdot 0 + z^{-2} \cdot 2 + z^{-3} \cdot 0 + z^{-4} \cdot 2 \\ &= 2 + 2z^{-2} + 2z^{-4} \end{aligned}$$

$$X(z) = \frac{2(z^4 + z^2 + 1)}{z^4}$$

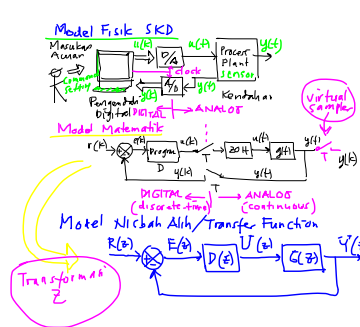
* TRANSFORMASI Z

(Ragunan & Zadeh, 1952)

Definisi: $Zf(s) = \sum_{k=0}^{\infty} z^{-k} f(k)$ $k=0,1,2,3,\dots$

Contoh: Istantaneous rate yang di cuplik dengan periode T
 $u(k) = 0, k < 0$
 $u(k) = 1, k \geq 0$
 $k=0,1,2,3,\dots$

$$\begin{aligned} U(z) &= \sum_{k=0}^{\infty} z^{-k} u(k) = z^{-0} u(0) + z^{-1} u(1) + z^{-2} u(2) + \dots \\ &= 1 + z^{-1} + z^{-2} + z^{-3} + \dots \\ &= 1 + z^{-1} [1 + z^{-1} + z^{-2} + z^{-3} + \dots] \\ &= 1 + z^{-1} U(z) \\ U(z) - z^{-1} U(z) &= 1 \\ (1 - z^{-1}) U(z) &= 1 \rightarrow U(z) = \frac{1}{1 - z^{-1}} = \frac{z}{z - 1} \end{aligned}$$



* TRANSFORMASI Z

(Prof. Ragazzini) - 1958
Univ of Columbia

$$\begin{aligned} G(s) &= \int_0^{\infty} g(t) e^{-st} dt \\ g(t) &= \mathcal{L}^{-1} G(s) \\ x(t) &= \mathcal{L}^{-1} X(s) \\ Y(s) &= \int_0^{\infty} y(t) e^{-st} dt \end{aligned}$$

$$\begin{aligned} G(z) &= \sum_{k=0}^{\infty} g(kT) z^{-k} \\ g(kT) &= \mathcal{L}^{-1} G(s) \\ x(kT) &= \mathcal{L}^{-1} X(s) \\ Y(z) &= \sum_{k=0}^{\infty} y(kT) z^{-k} \end{aligned}$$

