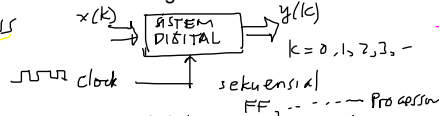


* Sistem Kausal/Non-Kausal

DEFINISI

Suatu sistem dikatakan non-kausal jika keluaran dan keadaannya pada saat ini bergantung pada masukan, keadaan dan/atau keluarannya pada masa yang akan datang

Contoh MATEMATIS



SISTEM A

$$y(k) = 10(k+1)x(k)$$

Kausal

k	x(k)	y(k)
0	1	10
1	0	0
2	1	30

SISTEM B

$$y(k) = 10kx(k+1)$$

non kausal

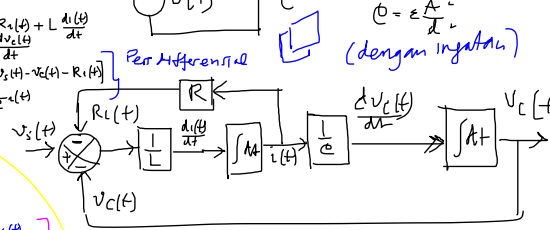
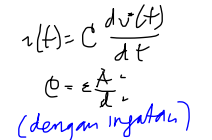
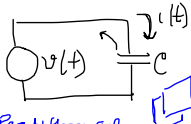
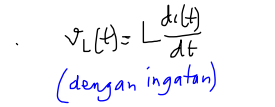
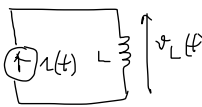
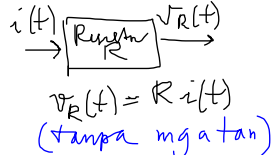
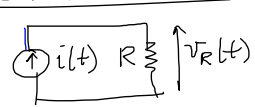
k	x(k)	y(k)
0	?	0
1	?	?
2	?	?

non-realizable

Sistem yang 'seolah-olah' NON-KAUSAL, padahal sebenarnya KAUHAL

Jika mundur 3 langkah
 $y(k-3) = 10(k-2)x(k-3)$
 $y(k) = 10(k+1)x(k)$
 ← KAUHAL

Contoh ELEKTRIK

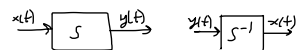


double integrator

* Sistem invertible dan non-invertible

DEFINISI

Suatu sistem dikatakan invertible jika memiliki inverse



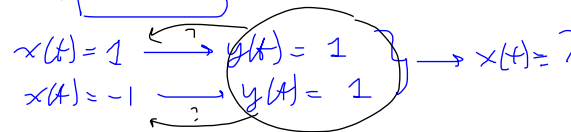
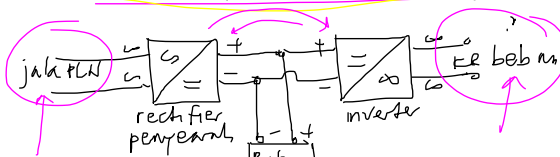
Invertibility: penting dalam "signal processing"

Sistem	INVERSE
Recorder	Play back
MIC	SPEAKER
Encoder	Decoder
Pemancar (TX)	Penerima (RX)
Modulator	Demodulator
Encrypt	Decrypt
Scrambler	Descrambler
Multiplexer (MUX)	Demultiplexer (DEMUX)

"INVERTER" inverse "RECTIFIER" ???

Bukan, rectifier non-invertible!

UPS: Uninterruptable Power Supply



Umumnya suatu sistem invertible karena terjadi pemetaan SATU-ke-SATU (one-to-one mapping) antara masukan dan keluaran



Bandingkan: $y(t) = [x(t)]^2$ = non-invertible (REAL)
 dengan $y(t) = [x(t)]^3$ = invertible

- * Pengertian SISTEM
- * Representasi SISTEM
- * Macam-macam SISTEM

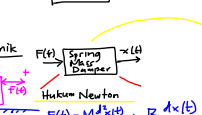
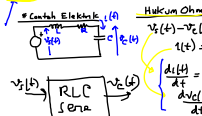
* Sistem dengan/tanpa ingatan

DEFINISI Suatu sistem dikatakan memiliki ingatan jika keluaran dan keadaannya pada saat ini bergantung pada masukan, keadaan dan/atau keluarannya pada masa yang lalu

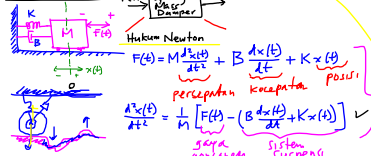
Contoh MATEMATIS

SISTEM A	SISTEM B
$y(t) = (t-10)x(t)$ tanpa ingatan	$y(t) = t \times (t-10)$ dengan ingatan

t = 13.00
 $y(13) = (13-10) \times (13) = 3 \times 13$
 $y(13) = 3 \times 13$



* Contoh Mekanik



Hukum Newton

$$F(t) = m \frac{d^2x(t)}{dt^2} + B \frac{dx(t)}{dt} + Kx(t)$$

percepatan kecepatan posisi

$$\frac{d^2x(t)}{dt^2} = \frac{1}{m} [F(t) - (B \frac{dx(t)}{dt} + Kx(t))]$$

gaya gesekan sistem suspenasi

Bagan blok



next = Mekanisme