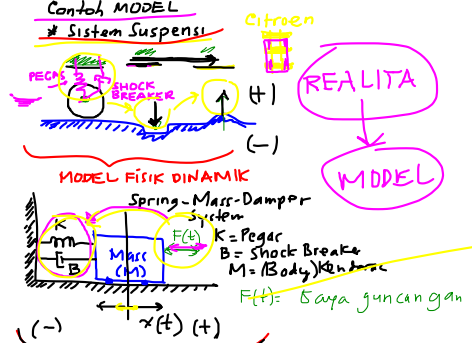
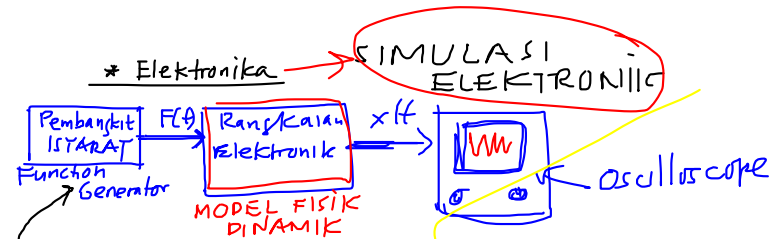




PEKAN DEPAN
Jum'at, 29 Nov 2013, jam 13.30
MIDTEST (40%) open-book
no-laptop
bahan ujian s/d materi 23/11/13
bisa diunduh dari
<http://www.unhas.ac.id/rhiza/arsip/kuliah/>
→ cari Pengantar-Teknologi



Persamaan Differensial:
Hukum NEWTON
KALKULUS

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

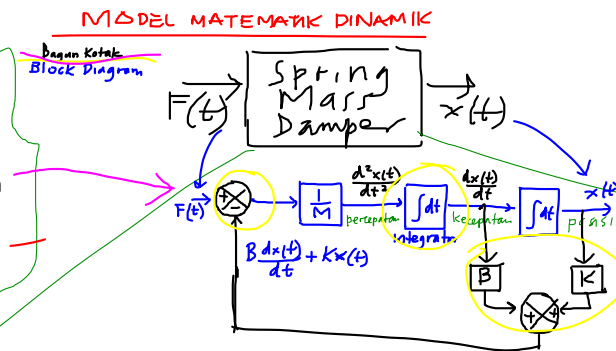
Percepatan Kecepatan Posisi

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

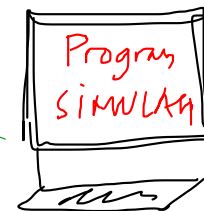
Percepatan = perubahan kecepatan

BERUBAH = kecepatan tidak nol

DIAM = kecepatan nol



* Programmer



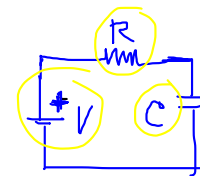
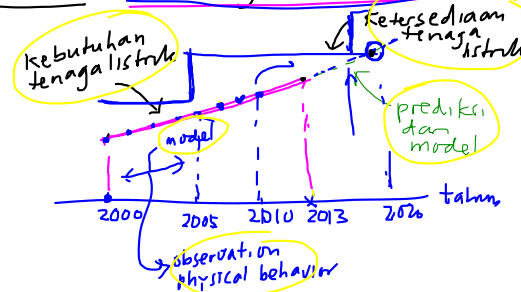
METODE NUMERIK

MODEL MATEMATIK DINAMIK

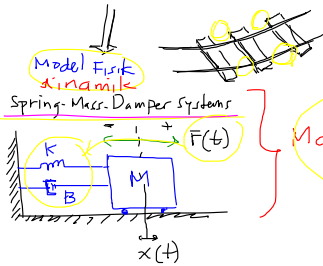
Pemodelan

Contoh

"Ketenaga-listrikan"



Pengantar Telekomunikasi



Model Matematika Dinamik

Hukum NEWTON

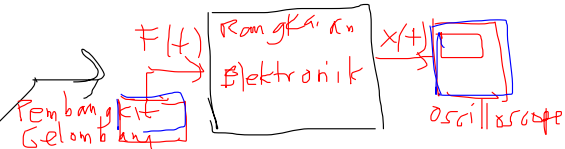
$$F(t) = M \frac{d^2x(t)}{dt^2} + B \frac{dx(t)}{dt} + Kx(t)$$

percepatan kecepatan posisi

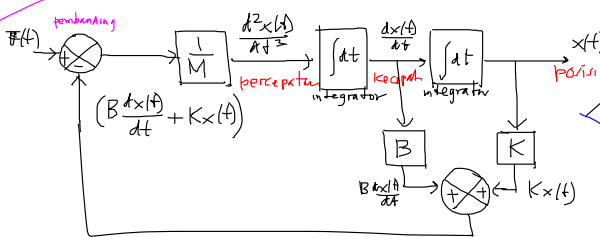
$$\frac{d^2x(t)}{dt^2} = \frac{1}{M} [F(t) - (B \frac{dx(t)}{dt} + Kx(t))]$$

(Persamaan Differensial)

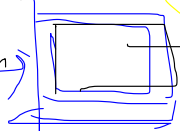
Bagan Kotak (Block Diagram)



Model Fisik



Program Metode Numerik



SIMULASI

Rencana: MID : 12/11/14, open book (NO LAPTOP)

Aljabar Bagan Kotak 05/11/14

NID TABLET

*** Bagan Kotak (Block Diagram)**

Alet Matematika untuk merepresentasikan MODEL sistem secara VISUAL

→ RE ISYARAT (signal) & PROSES (process)

*** Representasi ISYARAT**

Dalam bagan kotak, isyarat direpresentasikan dengan:

- Source (Sumber)
- Destination (Tujuan)
- Isyarat (Signal)
- Isyarat majemuk (Composite signal)

Suatu isyarat diberi 'label', misalnya:

- gelombang radio
- energi mekanik
- MASA 2014

Isyarat x yang berubah dengan waktu t (sebagai fungsi dari)

⇒ $y(t)$ isyarat y yang berubah setiap langkah $k = 0, 1, 2, 3, \dots$

Isyarat V voltage (tegangan) input (masuk) yang berubah dengan

V_i (input voltage)

V_o (output voltage)

NOTASI ISYARAT

$1\text{ m} = 10^{-3}\text{ m}$

$\pi \cdot D = \frac{1}{T}$

*** Representasi PROSES**

PROSES (SISTEM)

INPUT → OUTPUT

Contoh: "kotak" yang menerima input & menghasilkan output

NOTASI PROSES/SISTEM

Contoh: Kalimat atau frase

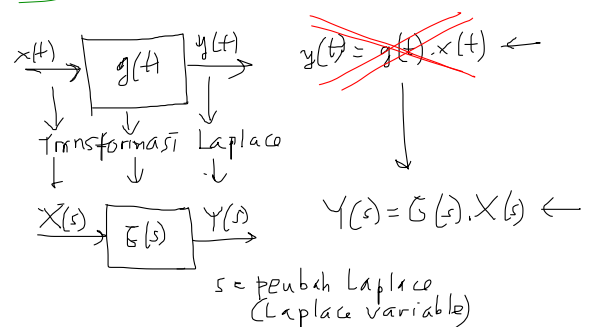
Huruf atau angka:

- $x(t) = 10 \cdot y(t)$ pengali
- $x(t) = \frac{1}{10} \cdot y(t)$ pengali
- $x(t) = \frac{dy(t)}{dt}$ diferensiator
- $x(t) = \int y(t) dt$ integrator
- $x(t) = \log(y(t))$ log
- $x(t) = 100 \cdot y(t)$ log

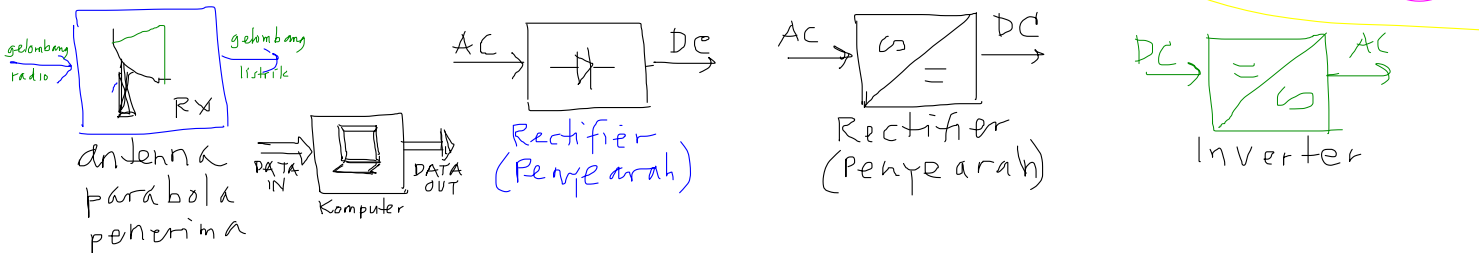
Operasi Matematika:

- $x(t) = \int y(t) dt$ integrator
- $x(t) = \frac{dy(t)}{dt}$ diferensiator
- $x(t) = \log(y(t))$ log
- $x(t) = 100 \cdot y(t)$ log

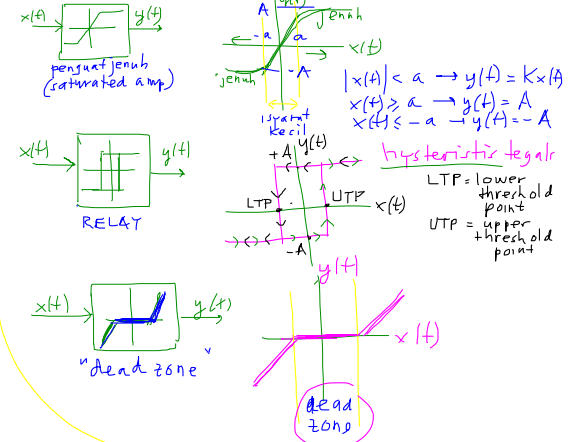
* Nisbah Alih (Fungsi Alih, Transfer Function)



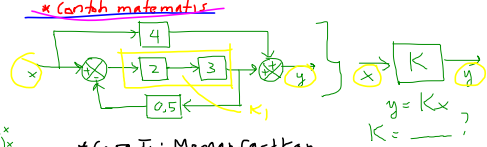
* Simbol-simbol Khusus



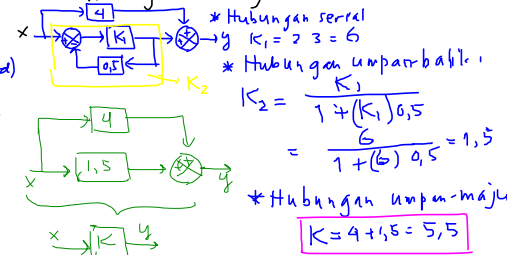
* Watak Alih (transfer characteristics)



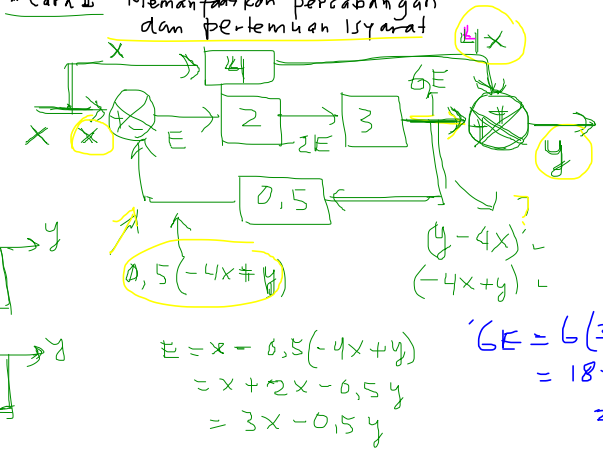
* CONTOH: CONTOH:



* Cara I: Memanfaatkan hubungan-hubungan



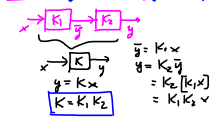
* Cara II: Memanfaatkan persamaan dan pertemuan isyarat



$6E = 6(3x - 0,5y)$
 $= 18x - 3y = y - 4x$
 $22x = 4y$
 $y = \frac{22}{4}x = 5,5x$
 $y = 5,5x$
 $K = 5,5$

ALJABAR BAGAN KOTAK

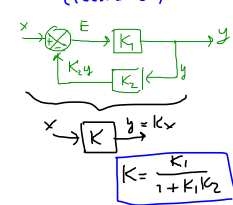
* Hubungan Serial (Cascadi)



* Hubungan Paralel

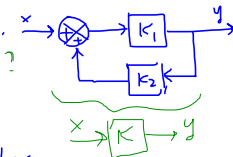


* Hubungan umpan-balik (feed back)



Bagaimana kalau:

* Umpan balik positif.



* Umpan balik satuan (unity feedback)

