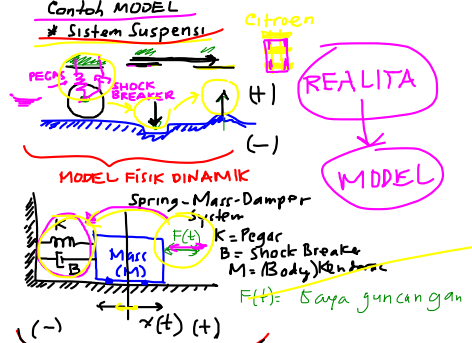




PEKAN DEPAN
Jum'at, 29 Nov 2013, jam 13 30
MIDTEST (40%) open-book
no-laptop
bahan ujian s/d materi 23/11/13
bisa diunduh dari
<http://www.unhas.ac.id/rhiza/arsip/kuliah/>
→ cari Pengantar-Teknologi,

Persamaan Differensial:
Hukum NEWTON
"KALKULUS"

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

Percepatan Kecepatan Posisi

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

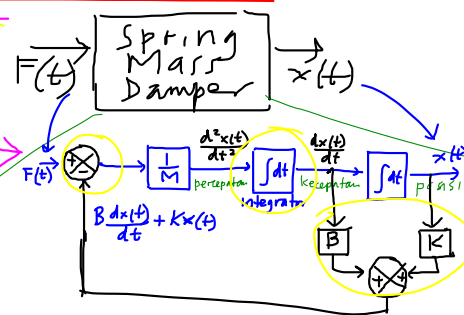
Percepatan = perubahan kecepatan

BERUBAH

DIAM = kecepatan nol
BERGERAK = kecepatan tidak nol

MODEL MATEMATIK DINAMIK

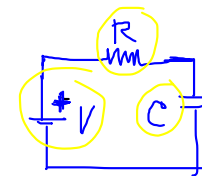
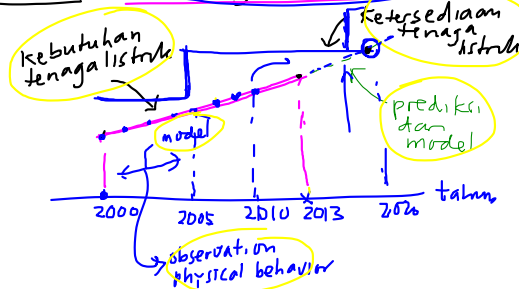
Bagan Kiri
Block Diagram



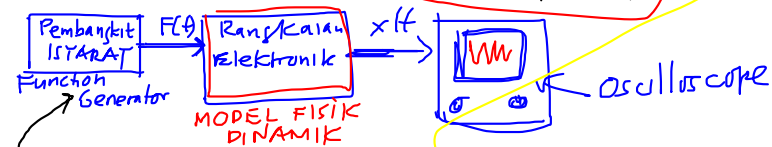
Pemodelan

Contoh

"Ketenaga-listrik"



* Elektronika → SIMULASI ELEKTRONIK



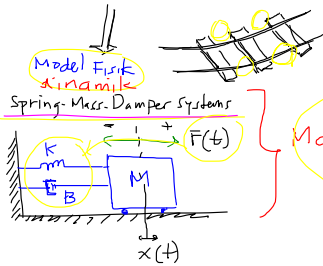
* Programmer



METODE NUMERIK

MODEL MATEMATIK DINAMIK

Pengantar Telekomunikasi



Model Matematika Dinamik

Hukum NEWTON

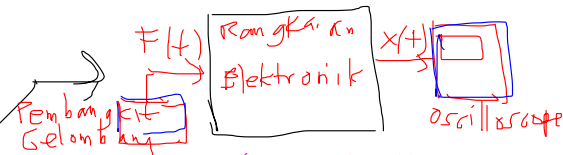
$$F(t) = M \frac{d^2x(t)}{dt^2} + B \frac{dx(t)}{dt} + Kx(t)$$

percepatan kecepatan posisi

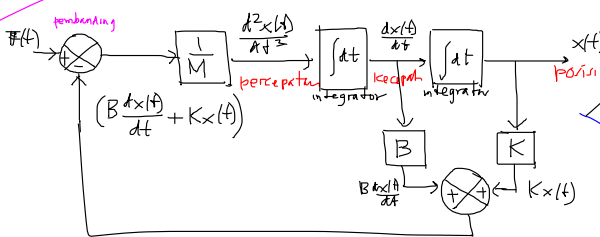
$$\frac{d^2x(t)}{dt^2} = \frac{1}{M} [F(t) - (B \frac{dx(t)}{dt} + Kx(t))]$$

(Persamaan Differensial)

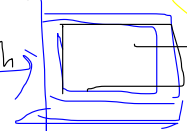
Bagan Kotak (Block Diagram)



Model Fisik

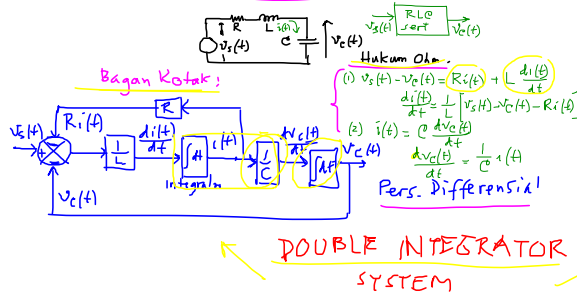


Program Metode Numerik



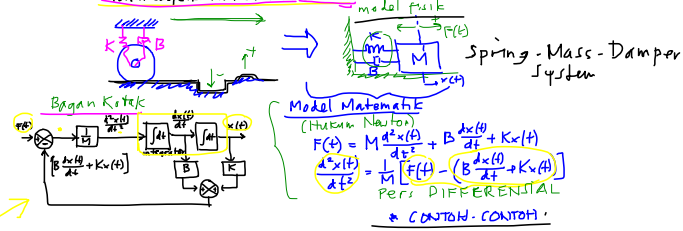
SIMULASI

* Contoh ELEKTRIK
Rangkaian Pemuatan Kapasitor
RLC-seri



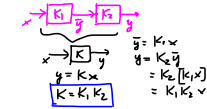
PEKAN DEPAN 19/11/14, 08 00 MIDTEST (40%)
OPEN BOOK, NO LAPTOP

* Contoh MEKANIKA
Sistem Suspensi Kendaraan Bermotor

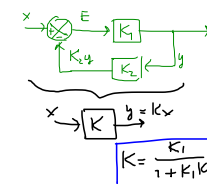


ALJABAR BATUAN KOTAK

* Hubungan serial (cascade)



* Hubungan umpan-balik (feed back)

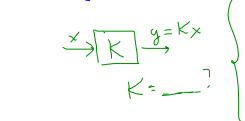


Bagaimana kalau.

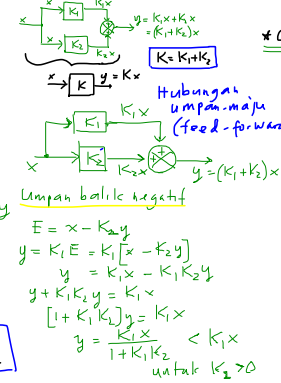
- * Umpan-balik positif.



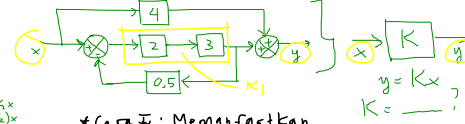
- * Umpan balik satuan (unity feedback)



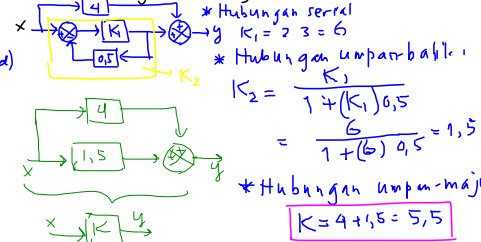
* Hubungan Paralel



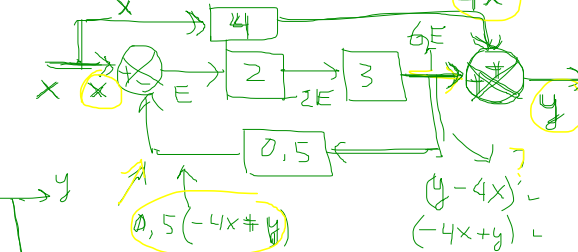
* Contoh matematis



* Cara I : Memanfaatkan hubungan-hubungan



* Cara II Memanfaatkan percabangan dan pertemuan isyarat



$$\begin{aligned} E &= x - 0,5(-4x + y) \\ &= x + 2x - 0,5y \\ &= 3x - 0,5y \end{aligned}$$

$$\begin{aligned} GE &= 6(3x - 0,5y) \\ &= 18x - 3y = y - 4x \\ 22x &= 4y \\ y &= \frac{22}{4}x = 5,5x \\ y &= 1x \end{aligned}$$

$$K = 5,5$$