

435D4233

PEMODELAN dan SIMULASI

MODUL 04C PROJECT 3

MENARA AIR

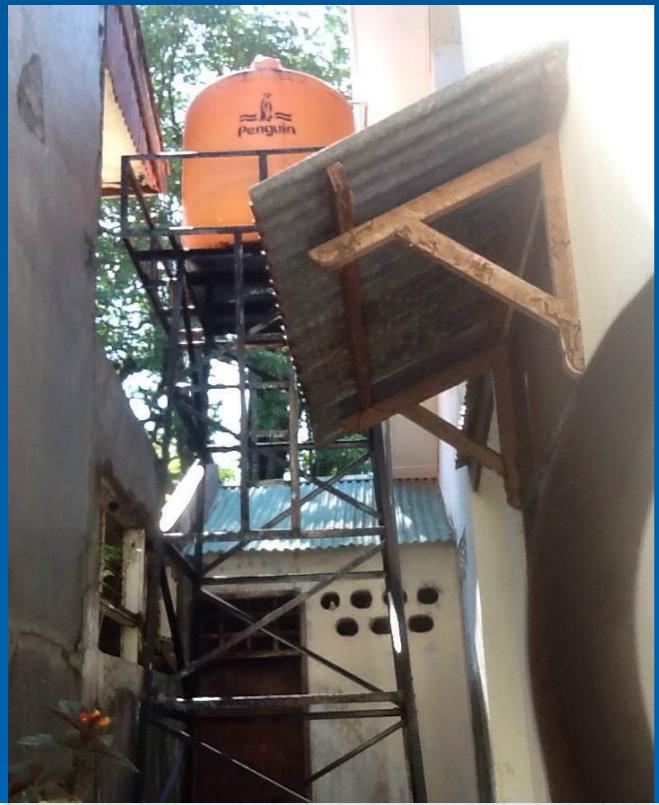
Semester Awal 2021-2022



PROJECT 3

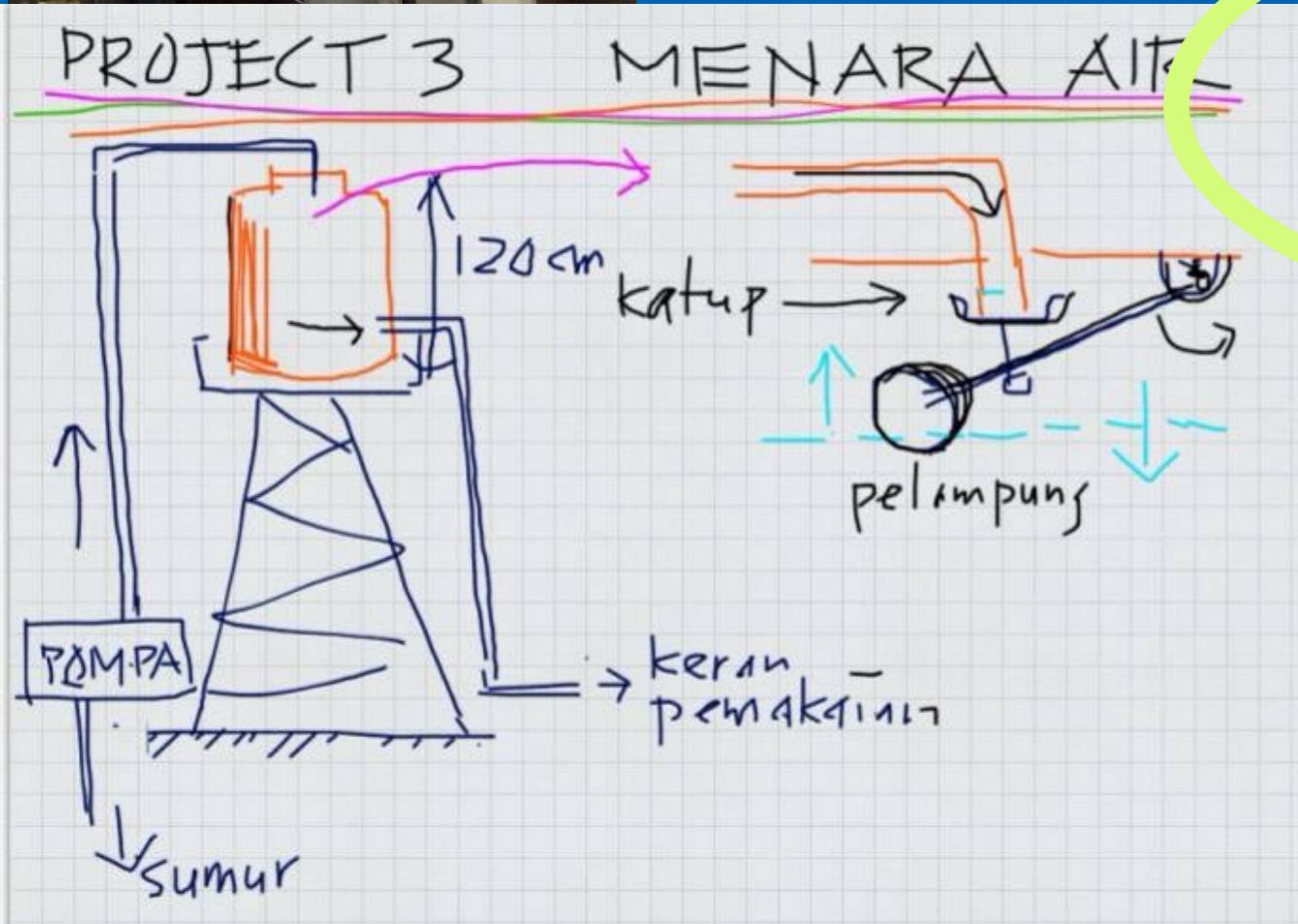
- Sumber pembelajaran (semua Projects): https://web.unhas.ac.id/rhiza/arsip/kuliah/Pemodelan-dan-Simulasi/dokumen_2018/
- (akan dibuat di): https://web.unhas.ac.id/rhiza/arsip/kuliah/Pemodelan-dan-Simulasi/MODE_DARLING_2021/

PEMODELAN SISTEM



Physical System:
Menara Air

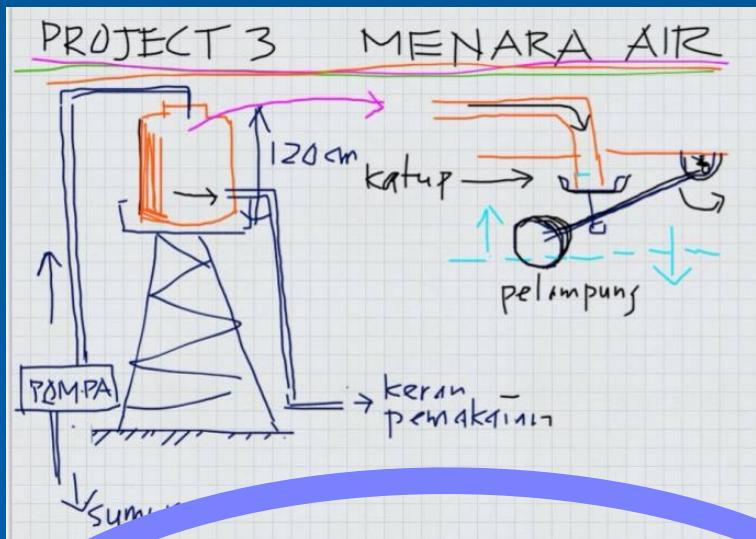
System (Physical) Model:
Menara Air



Project 3:
Menara Air

Computerized Model
and Simulation:
Simulink@MATLAB

MODEL FISIK DINAMIK:



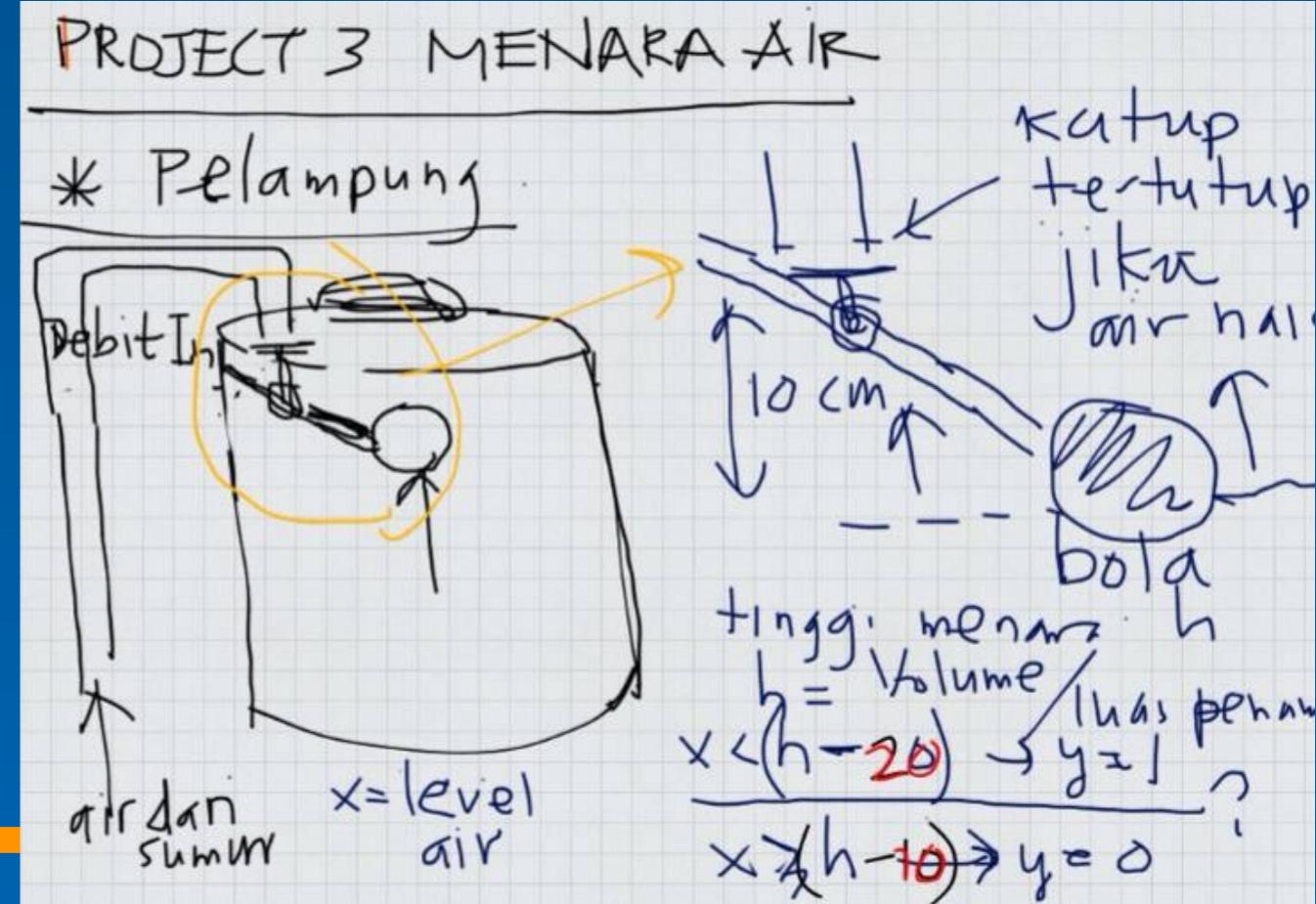
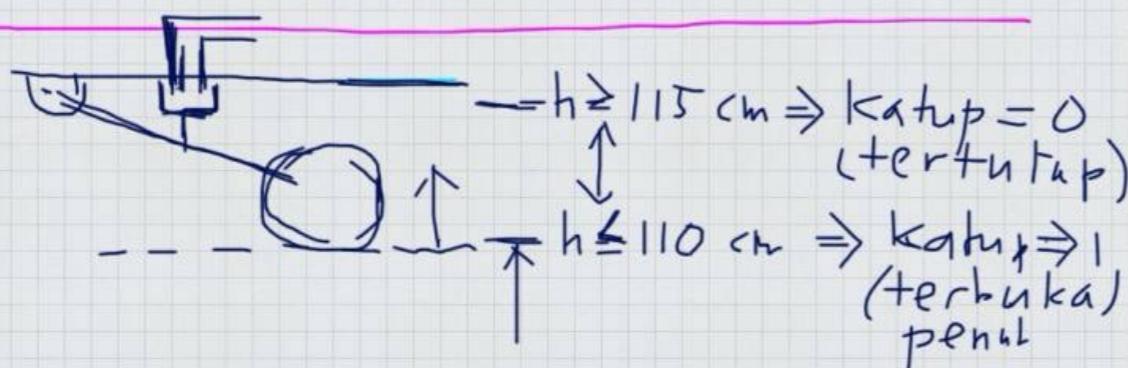
Model
MATEMATIK DINAMIK
Bagan Kotak
(Block Diagram)

$$\text{Volume} = A * h \quad [cm^3] - [cm^2] * [cm]$$

$$A = \pi \left(\frac{d}{2}\right)^2$$

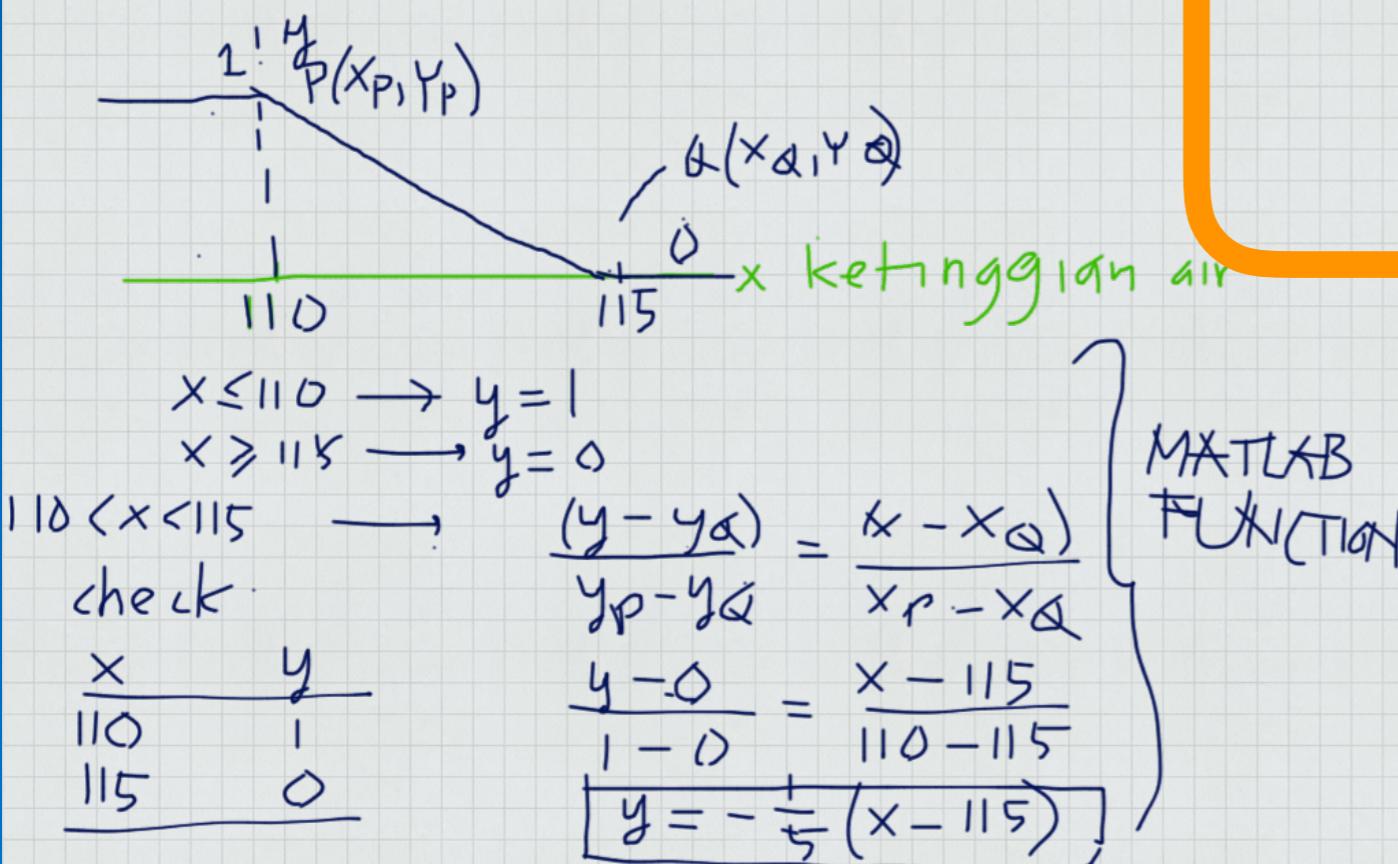
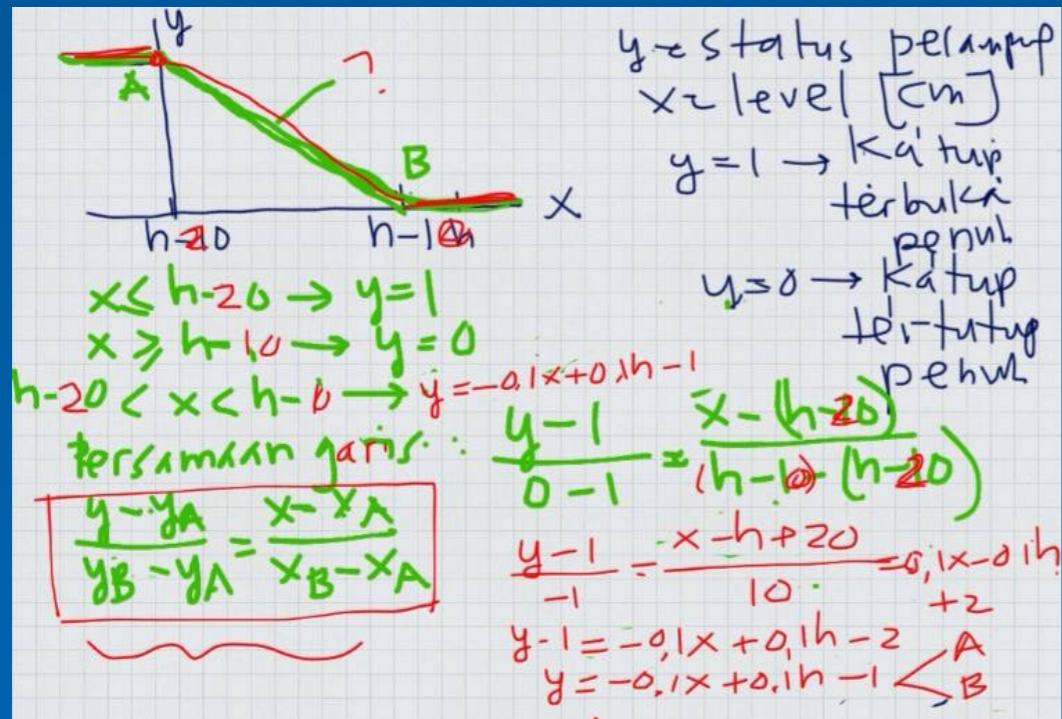
$$h = \frac{\text{Volume} [cm^3]}{A [cm^2]} \quad d [cm] \quad h [cm]$$

$$= \frac{\text{Volume} [liter]}{A [cm^2]} * 1000 [m]$$



- Tangki Air
- Pompa
- Pelampung
- Relay

MODEL MATEMATIK PELAMPUNG:



check

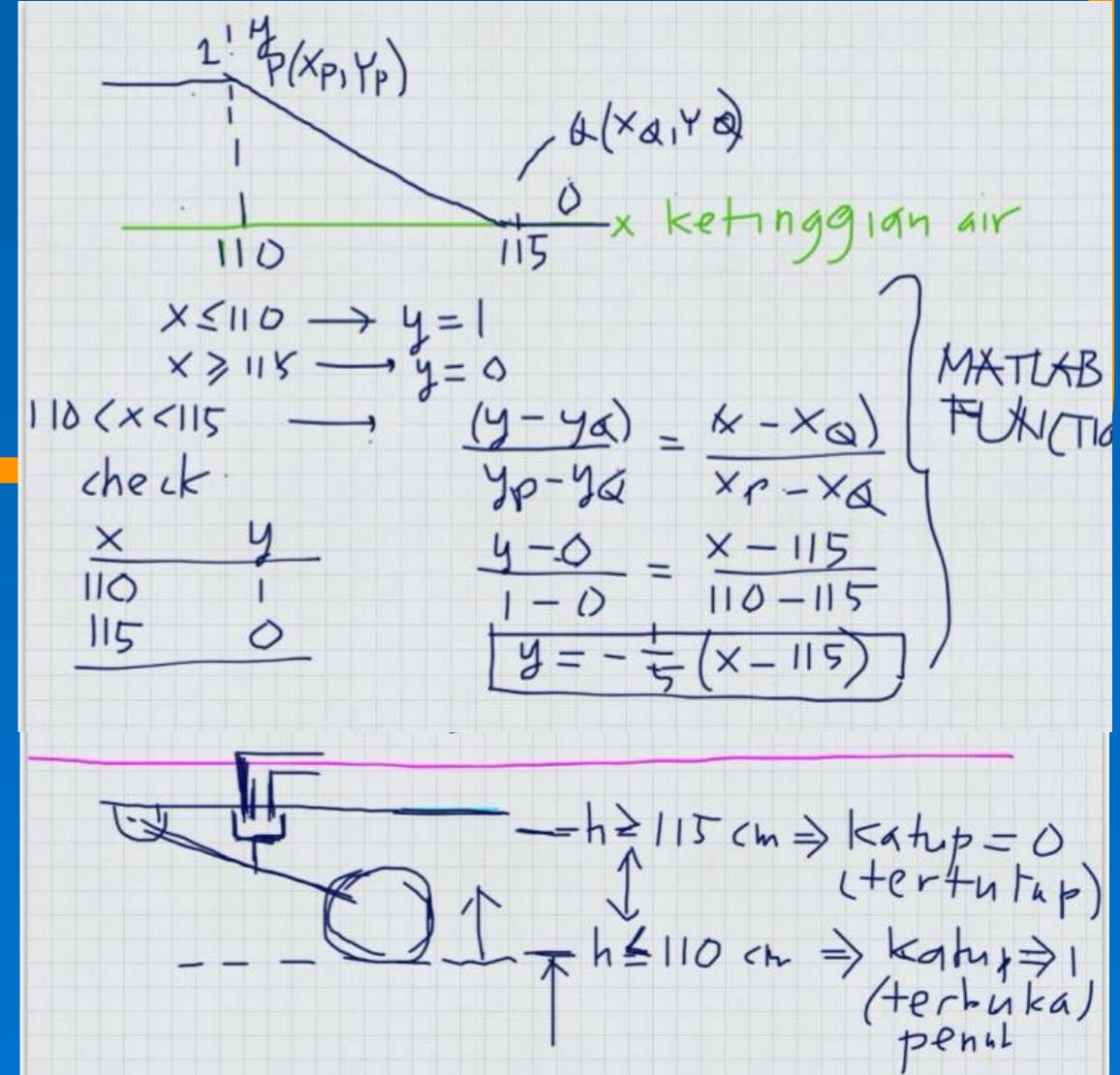
$$x = h-10 \rightarrow y = -\frac{1}{g}(h-10) + \frac{h-1}{g}$$

$$= -\frac{h}{g} + \frac{10}{g} + \frac{h}{g} - \frac{1}{g}$$

$$x = h-1 \rightarrow y = -\frac{1}{g}(h-1) + \frac{h-1}{g}$$

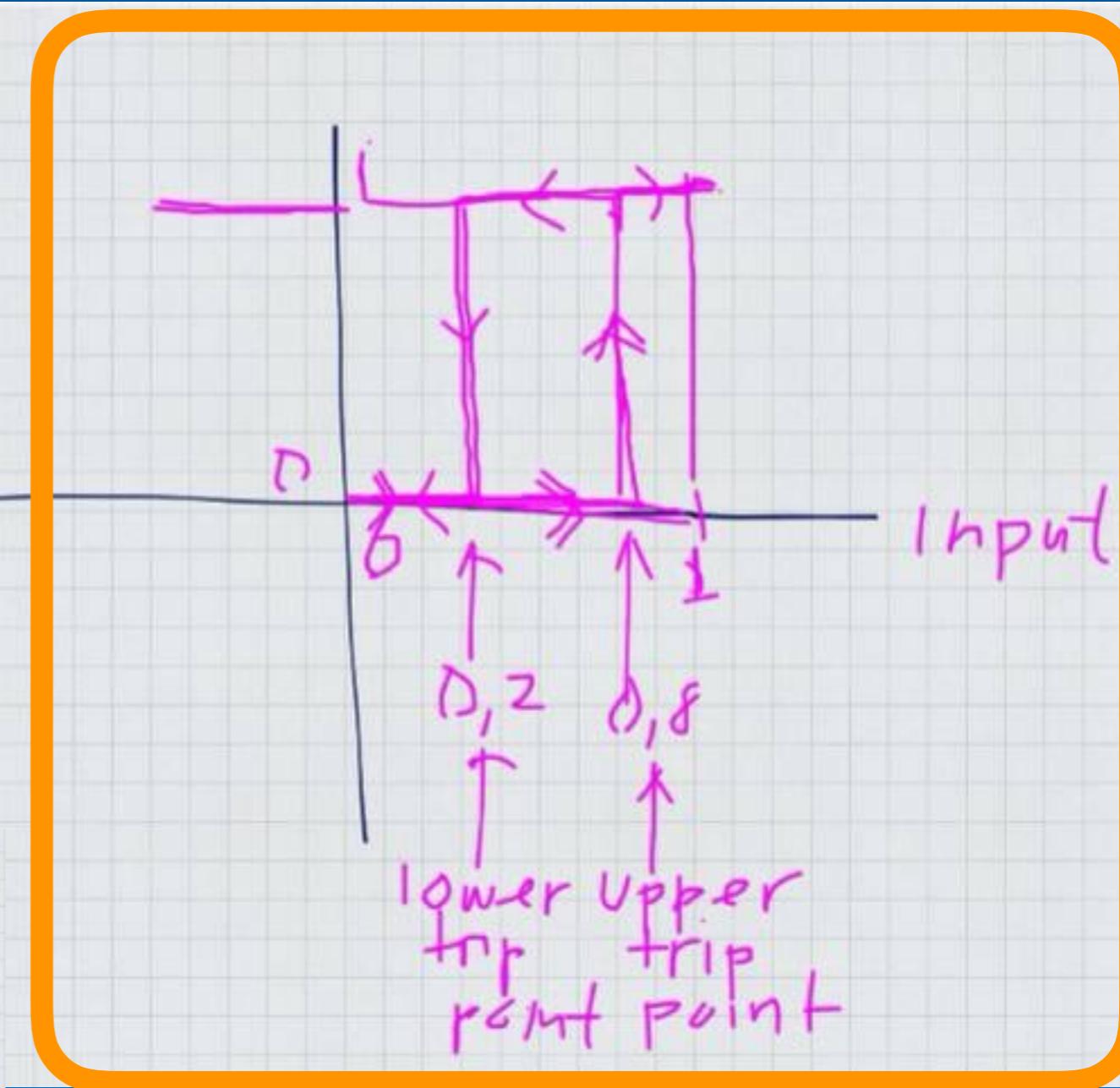
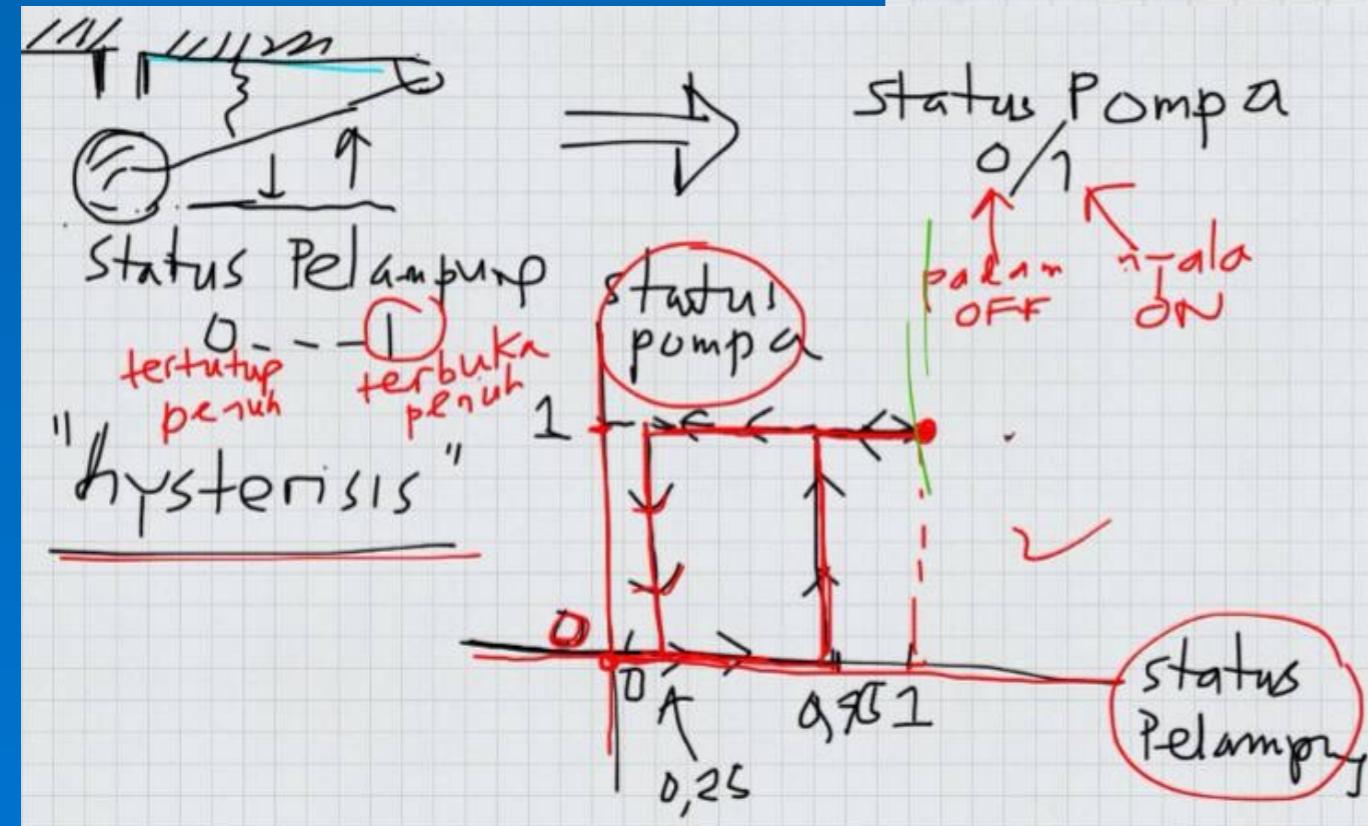
$$= -\frac{1}{g}h + \frac{1}{g} + \frac{h}{g} - \frac{1}{g}$$

$$= \cancel{0}$$



MODEL MATEMATIK RELAY:

* RELAY



PENGUKURAN FISIK di LAPANGAN

- **V** = volume TANGKI AIR [liter]
- **d** = diameter TANGKI AIR dalam [cm]
- **h** = tinggi TANGKI AIR dalam [cm], diukur atau dihitung

Waktu tunda (delay, **DELTA**) dalam [second]
PIPA NAIK dan **PIPA TURUN**

Debit Air [liter/second]:

- **POMPA AIR**
- **KERAN**

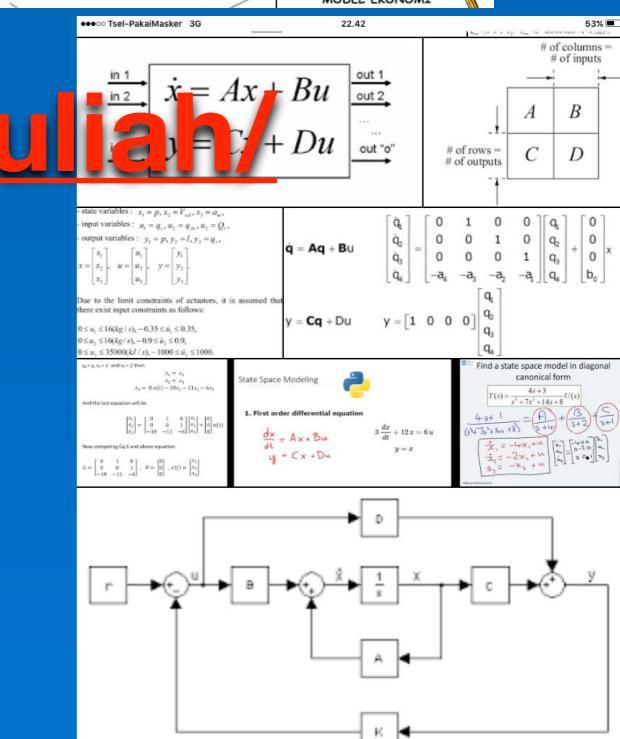
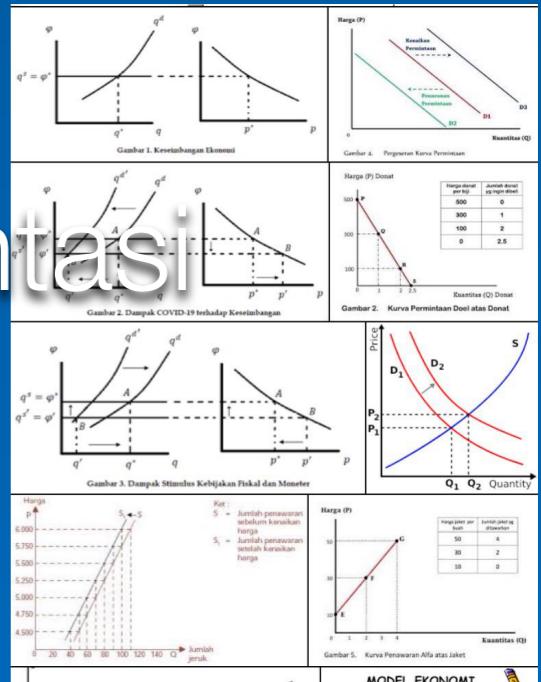
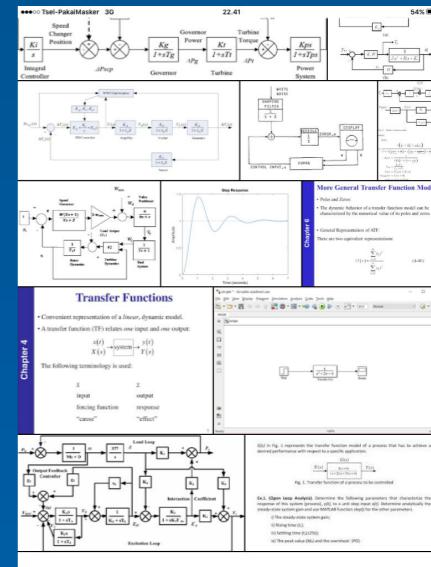
Dan Lain-Lain

nge-LURING !!!

Selanjutnya **Model SIMULINK** akan dibangun di kelas **LURING** ! Dokumentasi akan dapat dilihat di:

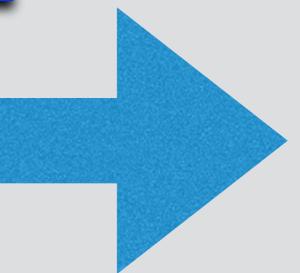
<https://web.unhas.ac.id/rhiza/arsip/kuliah/>

Pemodelan-dan-Simulasi/
MODE DARLING 2021/



MODUL SELANJUTNYA

- MODUL 01: (Pengantar/Review) **PEMODELAN SISTEM** (*System Modeling*)
- MODUL 02: **URGENSI PEMODELAN SISTEM**
- MODUL 03: **MACAM-MACAM MODEL SISTEM**
- MODUL 04A: **PROJECT 1** Verifikasi **SIMULINK** dengan **RMSE**
- MODUL 04B: **PROJECT 2 SISTEM SUSPENSI**
- MODUL 04C: **PROJECT 3 MENARA AIR**
- **MODUL 04D: KOLAM AIR HANGAT**



MODUL PEMBELAJARAN 04A, B, C dan D

Tugas-tugas **SIMULASI** menggunakan model
Simulink@MATLAB..... kita harus
siap-siap me-**LURING**.

- **PROJECT 1:** VERIFIKASI SIMULINK dengan **RMSE**
- **PROJECT 2:** SISTEM SUSPENSI
- **PROJECT 3:** MENARA AIR
- **PROJECT 4:** **KOLAM AIR HANGAT**

SELAMAT BELAJAR

Semoga SUKSES meraih PRESTASI!



$$\begin{aligned} \text{Volume} &= A * h \\ [\text{cm}^3] & - [\text{cm}^2] * [\text{cm}] \quad A = \pi \left(\frac{d}{2} \right)^2 \\ h &= \frac{\text{Volume } [\text{cm}^3]}{A \text{ } [\text{cm}^2]} \quad d \text{ } [\text{cm}] \quad h, [\text{cm}] \\ &= \frac{\text{Volume } [\text{liter}]}{A \text{ } [\text{cm}^2]} * 1000 \text{ } [\text{m}] \\ &V \text{ } [\text{cm}^3] \rightarrow \end{aligned}$$

Diagram below:

A schematic diagram of a cylindrical tank. A float valve is attached to the top horizontal pipe. The valve has two positions: an open position where the float is at the top of the vertical pipe, and a closed position where the float is at the bottom of the vertical pipe. Arrows indicate the movement of the float between these two positions.

Annotations:

- $h \geq 115 \text{ cm} \Rightarrow \text{katup} = 0$ (tertutup)
- $h \leq 110 \text{ cm} \Rightarrow \text{katup} \Rightarrow 1$ (terbuka)
- penutup

