

Automatic Control Laboratory

(Location: Electrical Engineering Department, 1st floor)

1- Lab Photos



Photo 1



Photo 2

2- Lab Description

The Automatic Control lab is used to teach the practical part of the courses of Electrical Testing (2) for students of the fourth level of the Electrical Power Engineering and Machines Program. It is also used in teaching the laboratory part of electrical machines courses for students of the other programs.

3- Lab Equipment

The following is a table of equipment and devices that are used in the experiments.



Electronic Unit
Model: (33-125)

Specification:

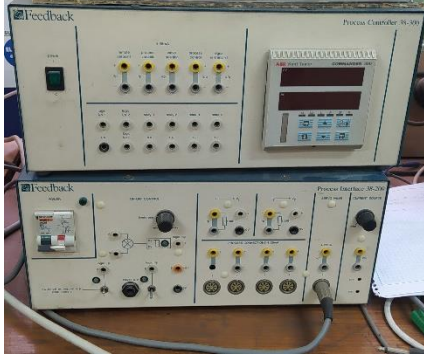
- Open printed circuit board with front panel mimic containing:
- Four input error amplifier
- PID analogue controller with independent gain controls
- Dual time-constant integrator
- Led display of encoder signals
- Embedded microprocessor containing multiple control algorithms
- USB2 interface
- 2 channel a/ d input
- 2 channel analogue and pwm d/a output
- 4 channel a/ d instrumentation interface
- Sweep function generator 0.1 Hz – 5 Hz, sine square & triangle
- 2 variable attenuators
- Variable DC signal



Mechanical Plant
Model: (33-100)

Specification:

- Open board format containing a servo mechanism and support electronics
- Permanent magnet motor with armature current signal output
- Tachogenerator 2.5 volts/1000 rpm
- Magnetic eddy current brake
- Input and output potentiometers
- Two-phase incremental shaft encoder Six bit Gray code shaft encoder Power amplifier, linear and pwm
- Switchable three figure LCD meter for speed or voltage
- Dimensions (mm) – 150 (h) x 295 (w) x 220 (d)
- Weight 2.3 kg



**Process Controller (top) with
Process Interface**
Process Controller model: 38-300
Process Interface model: 38-200



Oscilloscope
Model: V-252 & 20 MHz
EX 6 for frequency response and stability
investigation of linear closed loop system



Temperature Process Control Trainer

- Operates from mains water supply using water pressure regulator 38-481
- For operation with 110 V or 120 V 50/60 Hz supplies
- 3 phase supply is required so nominal 220 volts available across 2 phases
- 38-441 Temperature Auxiliary Control
- 38-490 Digital Display Module
- 38-421 Pulse Flow Control

4- Lab Experiments

First year:

Course: None

Code: None

Second year:

Course: None

Code: None

Third year:

Course: Electrical Testing (1)

Code: ELE305

- 1- Exp-1: Design and perform Addition and subtraction using operational amplifiers experiment.
- 2- Exp-2: Design and perform integration using operational amplifiers experiment.
- 3- Exp-3: Design and perform first order system for unit step input.
- 4- Exp-4: Design and perform second order system for unit step input.
- 5- Exp-5: Study state error evaluation subjected to different input signals.
- 6- Exp-6: Frequency response method: stability investigation of linear closed loop system and frequency response.
- 7- Exp-7: Dc servo system.

Fourth year:

Course: None

Code: None

5- Lab Maintenance

The laboratory is evaluated to determine the experiments and their readiness to participate in the teaching process and to determine the required maintenance periodically, and the capabilities and problems of the laboratory are periodically reported after each experiment.