Control in a MATLAB® environment

MATLAB® software is in use worldwide for the analysis and synthesis of control systems. Feedback Instruments offers a range of control training equipment which integrates with MATLAB® to explore advanced control techniques for:

- **Servos**
- **Twin Rotor MIMO System**
- **Self-erecting Digital Pendulum**
- **Magnetic Levitation**
- **Process Control Training**

All these products use Feedback's Real Time Control and Teaching software. Software and Manuals are provided on CD-ROM.

Digital Servo Workshop 33-004

Digital Servo Workshop based on the Servo Fundamentals Trainer. Introduces students to modeling servo mechanisms and basic identification methods, and how closed loop systems are influenced by design parameters.

Curriculum Coverage

- Real time digital control
- Mathematical modeling
- Transfer function & state space representation
- Frequency response
- Single input - Single output feedback control: time domain
- PID control
- Linear quadratic & time-optimal control

Modular Servo Workshop 33-008

Modular Servo Workshop is based on the Modular Servo System MS150. In addition to the standard MS150 analogue control & design system, the present format allows rapid and direct path from control system design to hardware implementation. It introduces the student to all phases of control system development and advanced control methods using MATLAB®, SIMULINK® and other toolboxes.

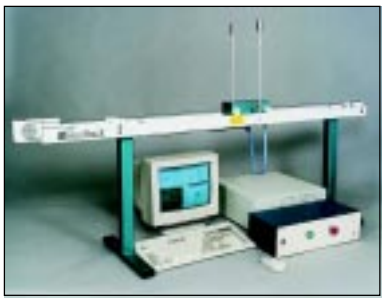
Curriculum Coverage

- Real time digital control
- Mathematical modeling
- Transfer function & state space representation
- Frequency response
- Single input - Single output feedback control: time domain
- PID control
- Linear quadratic & time-optimal control
- Motor Characteristic
- Speed and position control
- On-line tuning of parameters

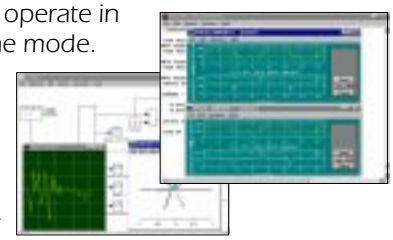
NOTE: The mininmum software requirement for these products is Windows 95 with MATLAB® 5.1, SIMULINK® 2.1, Signal Processing Toolbox 4.0.1 and Control System Toolbox 4.0.1. Digital Pendulum System & Twin Rotor MIMO System require other specific toolboxes. MATLAB® 5.2 with its toolboxes can also be used. Contact Feedback Sales for further information.

Control in a MATLAB® environment

Digital Pendulum Control System 33-005



The **Digital Pendulum Control System** provides experiments on an inverted balanced pendulum using digital control techniques. It is a single input, multiple output system. The pendulum is self-erecting and can also operate in crane mode.



MATLAB® *software screens*

Curriculum Coverage

- Real time digital control
- On-line model identification & tuning
- Transfer function & state space model in SIMULINK®
- PID control for crane mode or double PID control for crane and pendulum
- Linear quadratic control
- Rule-based control
- Fuzzy-logic control
- Animation

Magnetic Levitation System 33-006

The **Magnetic Levitation** system presents this classic control problem with both analogue and digital solutions. The suspended body is a 25mm hollow steel ball. In the analogue mode the system is fully self-contained. In the digital mode it operates with MATLAB® /SIMULINK® software.

Curriculum Coverage

Analogue

- Non-linear control problem
- Closed loop control

Digital

- Real time digital control
- Linearisation of non-linear model
- Analogue-Digital control, conversion methods
- Closed loop PID control
- State feedback control

Twin Rotor MIMO System 33-007

The **Twin Rotor MIMO** (multiple input, multiple output) system provides a high-order, non-linear system with significant cross-coupling. Both PID and State Feedback controllers are installed as embedded controllers in the real-time kernel software.

Curriculum Coverage

- Real time digital control
- Model identification & tuning for 1degree of freedom (DOF), either vertical or horizontal
- Non-linear model & state space representation
- 1DOF & 2DOF PID control for stabilisation or tracking
- Feedback linearisation
- Linear quadratic control
- Fuzzy-logic control
- Mouse control animation

Process Control Workshop 37-001

A classic process control problem exhibiting transport-delay in a new way: A real-time control system developed through the integration of PT326 external hardware to MATLAB® /SIMULINK® software. Existing PT326 units may be upgraded.

MATLAB®, SIMULINK® and their toolboxes are products of The Mathworks Inc. and are not included in the systems.

For further information on these and other equipment in the Feedback range please contact . . . . . .

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