BYTRONIC
Educational Technology

Modular Servo Workshop MSW

Key Features:

- Laboratory model of servo system compound with different modules
- Modules to demonstrate: inertia, backslash, damping, elasticity and friction
- Multivariable SIMO
- Rapid prototyping of real-time control algorithms
- Full integration with MATLAB Simulink. Operation in real-time

The Modular Servo Workshop (MSW) system has been designed for the study and practical application of basic and advanced control methods. These included typical variable factors such as friction, damping and inertia and a number of position/speed control methods ranging from PID to LQ and time-optimal control. The flexible design of the MLS allows the configuration of a system to be modified to suit user requirements.

The MSW has an integrated environment for the analysis of digital servo control problems and synthesis of control algorithms. The system comprises several hardware units, and software. The DC motor module can be coupled with several other modules by timing belts. A number of linear and nonlinear mechanical modules have been designed to show the influence of backslash, damping, elasticity and friction. The units may be studied individually before completing the system. The linear damping module consists of a paramagnetic disc which runs between the poles of the permanent magnet. The inertia module contains a solid metal roll. The encoder module is used to measure the rotational angle. A steel base plate provides firm fixing to the modules, enabling imitation of block schematic diagrams, however, all electrical connections are performed inside the software.

The system can be classified as multivariable (SIMO) with two measurable states and one control variable.

The MSW operates with a PC based digital controller that communicates with the position sensor and motor by an I/O board. The I/O board is controlled by the real-time software which operates with MATLAB/Simulink. A comprehensive range of experiments may be carried out using Modular Servo and associated software.

Curriculum Coverage

- Starting, testing and stopping procedures
  - Starting procedure
  - Testing and troubleshooting
- Servo control window
  - Basic test
  - Manual setup
- RTWT driver
  - Simulation models
  - Identification
  - Demo controllers
- Mathematical model of the servo system
  - Linear model
  - Nonlinear model
- RTWT model
  - Creating a model
  - Code generation and the build process
- Basic assignments
  - Basic measurements
  - Steady state characteristics of the DC servo
  - Time domain identification
  - Identification task by the surface method
  - Time domain identification experiment
- Advanced assignments
  - PID position control
  - PID velocity control
  - Multivariable control design
  - Pole-placement method
  - Deadbeat controller
  - Optimal design method: LQ controller
  - The continuous case
  - The discrete case

Specification	
Motor	12V d.c. Analogue or PWM controlled
Mechanical modules	7 x Mechanical modules Position sensor Speed sensor Incremental encoder, Tacho-generator
Mounting rail	A steel base-rail
Interface	Internal PCI or external USB board
Power supply	Power interface

Required

A suitable PC with minimum; Pentium processor, 1GB RAM, 20GB HDD, CDROM Drive, USB Interface and Windows XP or above

Ordering Information

Model Number:	**MSW**
Consists of:	1 x Modular servo workshop unit 1 x I/O board and cable 1 x Manual 1 x Software CD with toolbox for MATLAB/Simulink

Weights and Dimensions

Un-Packed		**Packed**	
Approximate Dimensions (mm)	900W x 100D x 145H	Approximate Dimensions (mm)	1000W x 200D x 200H
Approximate Weights	10Kg	Approximate Weights	15Kg

Bytronic Limited
124 Anglesey Court, Towers Business Park,
Rugeley, Staffordshire, WS15 1UL.
United Kingdom
Tel; +44(0)8456 123 155 Fax; +44(0)8456 123 156
Email: sales@bytronic.net Website: www.bytronic.net

