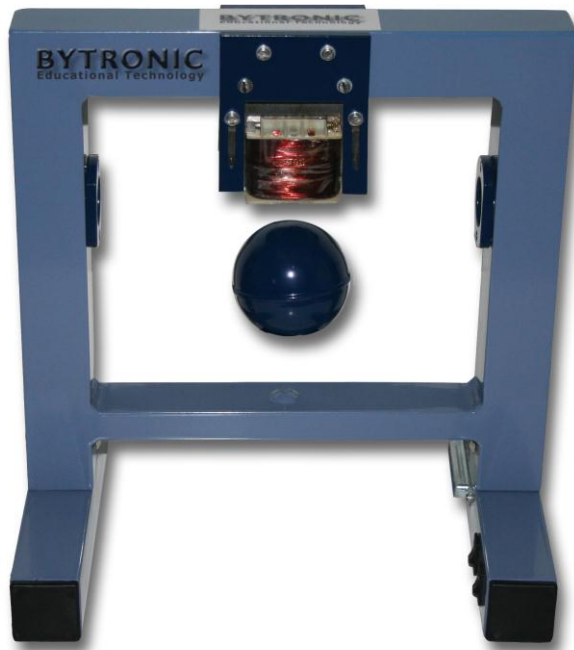


## Magnetic Levitation System MLS



### Key Features:

- Nonlinear control
- SISO, MISO, BIBO controllers design
- Closed loop PID control
- Real-Time control
- Frequency analysis
- Intelligent/adaptive control
- System model and identification procedures
- Hardware-in-the-loop

The Magnetic Levitation System (MLS) is a classic control problem used in many practical applications such as transportation, magnetic levitated trains, using both analogue and digital solutions to maintain a metallic ball in an electromagnetic field. The MLS is a single Degree of Freedom system for teaching of control systems; signal analysis, using real-time control applications such as MATLAB.

The MLS is a nonlinear, open-loop unstable and time varying dynamical system. The basic principle of MLS operation is to apply the voltage to an electromagnet to keep a ferromagnetic object levitated. The object position is determined through a sensor. Additionally the coil current is measured to explore identification and multi loop or nonlinear control strategies.

### Curriculum Coverage

- Laboratory set-up
  - Hardware and software requirements
  - Features of MLS
  - Typical teaching applications
  - Software
- ML main window
  - Identification
  - Sensor
  - Actuator static mode
  - Minimal control
  - Actuator dynamic mode
  - Maglev device drivers
  - Simulation model and controllers
  - Open loop: PID, LQ, LQ tracking
  - Levitation: PID, LQ, LQ tracking
- Description of the magnetic levitation class properties
  - Base address
  - Bit stream version
  - PWM
  - PWM prescaler
  - Stop
  - Voltage
  - Thermal status
  - Time
  - Quick reference table

## Specification

MLS

1 x Electromagnet mounted in a frame  
2 x Ferromagnetic objects (spheres) with different weight  
1 x Photo detector to sense the object position  
1 x Coil current sensor  
1 x Power interface  
1 x PCI measurement and control I/O board  
Aluminium construction

## 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:** **MLS**

*Consists of:*

1 x Magnetic levitation unit  
2 x Ferromagnetic object  
1 x I/O board and connecting cable  
1 x Manual  
1 x Software CD with toolbox for MATLAB/Simulink

## Weights and Dimensions

### Un-Packed

Approximate Dimensions (mm) 290W x 290D x 380H  
Approximate Weights 8Kg

### Packed

Approximate Dimensions (mm) 410W x 410D x 510H  
Approximate Weights 10Kg

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