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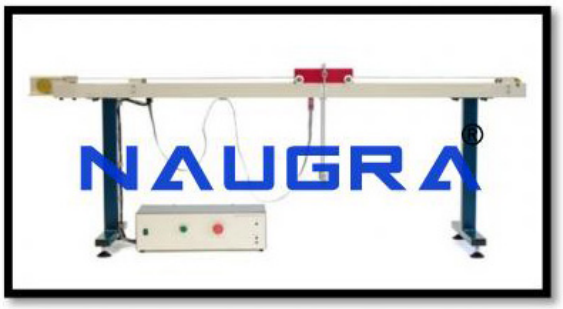
Product Name :	**Product Code :**
Digital Pendulum System	CE171



Description :

Digital Pendulum System

Technical Specification :

Digital Pendulum System
The Digital Pendulum is a modern version of a classical control problem; that of erecting and balancing a free swinging pendulum in its inverted position or moving a hanging pendulum in a controlled manner. The cart on the track is digitally controlled to swing up (self-erecting) and to balance the pendulum into an upright sustained position or to move the cart with pendulum in an unperturbed down position. The cart track is of limited length, imposing constraints on the control algorithm. In pendulum mode the system is used to control the twin arm pendulum from an initial position, hanging at rest with the cart in the centre of its travel along the track, to a final position with the pendulum upright and the cart restored to its central position. In crane mode the control problem is to move the position of the cart without undue movement of the pendulum. This problem is typical of that experienced when controlling a gantry crane. Using MATLAB together with the detailed training manuals supplied by Feedback and an Advantech PCI card (which
creates an impressive digital control system development environment) the user is guided through the design process using phenomenological process models, dynamics analysis, discrete models identification, controller design, controller tests on the model, controller implementation in real-time applications, implementation of various control strategies and visualisation.
Curriculum Coverage
Pendulum Model
Equations of motion
Non-linear model
Linear models

Static friction compensation
Running a real-time model
Dynamic model
Cart model identification
First model identification
Using MATLAB control (MATLAB not supplied)
Crane linear model identification
Inverted pendulum linear model
Pendulum set-up control
Plant control
PID controller
PID control of cart model position
Real-time PID control of cart position
Real-time swing-up control
Inverted pendulum control of swing-up
Inverted pendulum stabilisation
Crane control
Combined control techniques
Swing-up & hold
Up & down model

Features:
Classic control problem
MATLAB compatible (MATLAB not supplied)
Dual mode system - crane / inverted pendulum / self-erecting pendulum mode
Comprehensive experiment manual

Technical data:
Operates from either 110 V or 230 V, 50 Hz or 60 Hz
Power requirements Line voltage: 200/250 V or 100/125 V, 50 or 60 Hz, 100 VA
Dimensions: length 1720 mm x height 600 mm without cart, height 655 mm with cart, depth of stand 410 mm, depth of channel 100 mm
Weight: 23 kgs.

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