

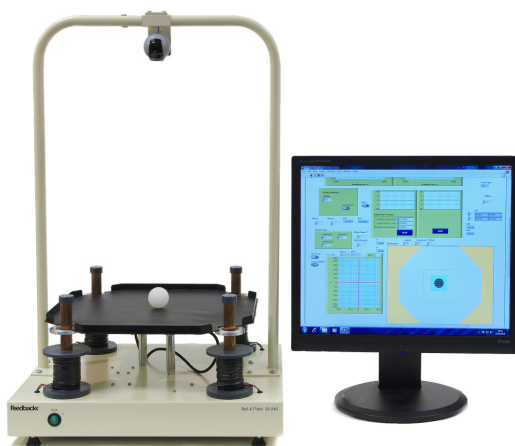
Ball and Plate Control System

33-052

Imagine throwing a ball onto a plate and it being stabilised exactly in the centre within two seconds. The remarkable response of this control system is due to the implementation of advanced control techniques which are now prevalent in modern industrial processes.

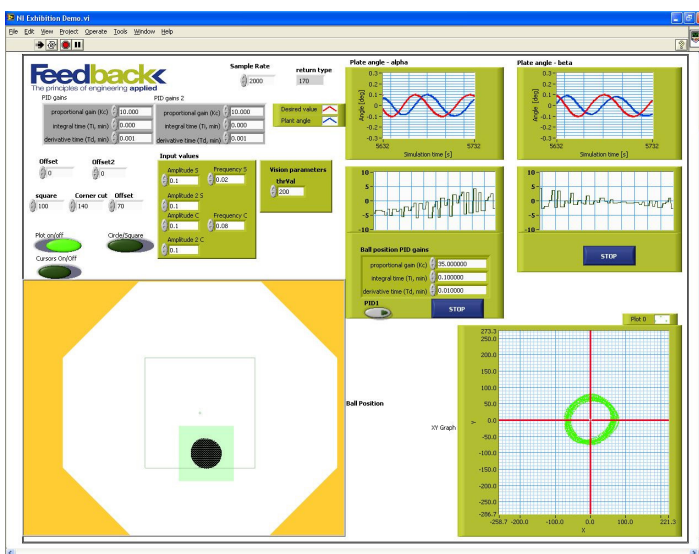
Feedback Instrument's Ball and Plate Control System is controlled by NI LabVIEW using a NI 6229 interface card and demonstrates a classic control problem of balancing a sphere on a flat surface and maintaining its position. It can then be programmed to make the ball describe a circular or any other shaped path around the plate. The unique electromagnetic table actuation enables the study of this unstable system in real-time using sophisticated controllers in NI LabVIEW.

The progressive nature of the student exercises enables the study of the problem from first principles to more advanced control concepts. The product provides a useful insight into control engineering at all levels of undergraduate study and enables advanced users to model and control the Ball and Plate using their own strategy.



Features

- Intriguing control experiment featuring extensive courseware
- Progressive student exercises
- Enables study of real-time control of a non-linear and unstable process
- Implementation of digital control techniques using NI LabVIEW
- Ball position sensing and image processing using USB camera
- Open and closed loop configurations
- Fully assembled plant with integral power supply
- Open architecture, design-orientated system, suitable for undergraduate courses in electrical, electronic and mechanical engineering



Screen showing the LabVIEW operating environment, enabling the student to learn the principles of the subject by means of a graphical user interface.

Curriculum Coverage

Ball and Plate Model

- Non-linear Ball and Plate model
- Non-linear model simplification
- Non-linear model testing
- Model linearization
- Linear model

Ball and Plate model identification

- Model identification
- Plate model identification
- Ball on plate model identification

Ball and Plate setup control

- Plant control
- PID controllers
- Plate orientation control
- PID control of plate orientation
- Real-time PID control

1-D Ball Control

- 1-D PID control of ball position
- Real-time 1-D PID control of ball position

2-D Ball Control

- 2-D PID control of ball position
- Real-time 2-D PID control of ball position

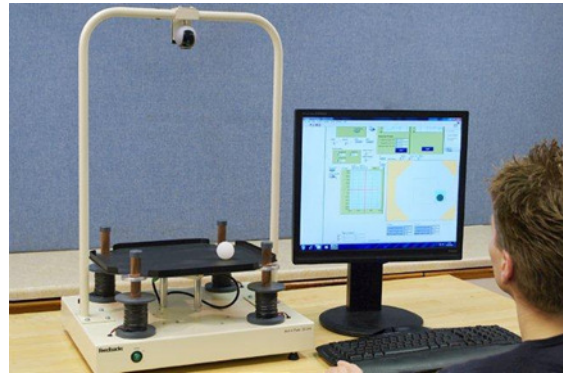
Trajectory Tracking

- Trajectory tracking with ball
- Real-time trajectory tracking with ball

Ordering Information

33-052 — Ball & Plate Control System complete with student software, NI LabVIEW interface card and cable

33-240 — Ball & Plate Control System with student software (NI LabVIEW interface card and cable **not** included)



Specification

Dimensions and Weight

Overall dimensions of instrument:
Height: 730 mm x Width: 460 mm x Depth: 390mm.
Weight 15kg.

Services Required

Power Supply included. 230V ac operation.
Dual core PC with one spare full height PCI slot.
Windows XP or higher operating system.
NI LabVIEW software version 9.0.1 or above.

Tender Specification

A self-contained positional control training instrument utilising electro-magnetic actuators.

To be used for the teaching of the principles of position control.

The system operates in real-time when connected to a PC via a USB connection.

Supplied with teaching manual and student exercises.

Operates within NI LabVIEW environment.

Feedback

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