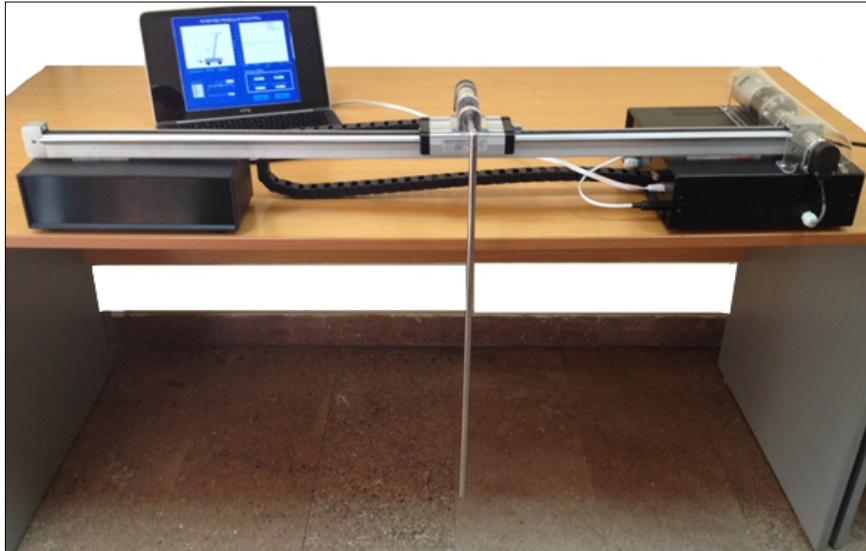


Inverted Pendulum



Overview

The laboratory stand «Inverted Pendulum» is developed using National Instruments' technologies. It is a nonlinear unstable system, an ideal experiment platform for teaching control theories and conducting various control experiments. The stand is based on programmable platform NI Single-Board RIO (NI sbRIO) which is meant for data acquisition.

Features

- High resolution optical encoders to sense position of the cart and pendulum angle
- The results can be saved in Microsoft Word
- User-friendly graphical interface
- Fully compatible with LabVIEW
- Pendulum easily attaches to front shaft of the Linear Servo Base Unit
- Stability and parameter robustness
- High quality aluminium chassis with precision-crafted parts
- Easy-connect cables and connectors
- The stability and controllability of a system can be visually shown through the inverted pendulum
- The stand satisfies various needs for control teaching and research



Hardware and Software

- Real-Time controller with FPGA and Digital Inputs
- Full H-Bridge Brushed DC Servo Drive Module
- Power supply with 24 VDC, 10 A output
- Windows XP, Vista, 7

List of Labs

- System identification
- Cart position control
- Pole placement design
- LQR controller design
- Inverted pendulum as a gantry crane
- Swing-up control
- Luenberger observer

Applications

- Segway
- Satellite carrier rocket
- Robot
- Ballbot
- iBOT
- Unicycle