Project Code: QL3-06
Feedback Control through Internet

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Introduction
The project is to implement a feedback control system between two computers through a remote communication medium.

- Internet is used as the medium transmitting signals from one computer to another to control the system, with the first computer measuring the data and the other analyses them.
- The ball and beam setup acts as the feedback control system which the location of the ball being the data for transmission.

Objective & Aim
Using the remote communication channel, the feedback system can be controlled not only locally, but in anywhere. Here are the procedures to be done:
1. To produce a server and client pair to transmit signals
2. To measure and control the ball-and-beam system through the client side
3. To do the analysis through the server side
4. To send analyzed results back to the client side and further adjust the location of the ball by moving the angle of the beam using the motor

After the communication and several adjustments, the location of the ball should be at the middle point of the beam.

Block Diagram
Implementation & Results

(a) Ball and Beam Part

Assume there is no outside disturbance to the ball.

1. A voltage is supplied to both ends of the beam
2. Measure the voltage between the ball and one end of the beam
3. Measurements is sent to computer to calculate the voltage needed to supply to the motor
4. Motor moves accordingly to control the orientation of the beam
5. Position of the ball changes

These procedures will be continuously operated until the ball is at the middle point of the beam.
(b) Communication Part

CSocket Class of the C++ is used as the medium of connection between the two computers in this project.

CSocket is a function for programmers to use Windows Socket in conjunction with Microsoft Foundation Class Library (MFC).

(1) The client computer retrieves the voltage measured by voltmeter

(2) Measurements are sent to the server computer for analysis

(3) Processed data is sent back to the client computer

(4) Client computer will send the signal to the amplifier and control the voltage supplied

(5) The motor moves accordingly

Building up network between server and client computer

Communication established