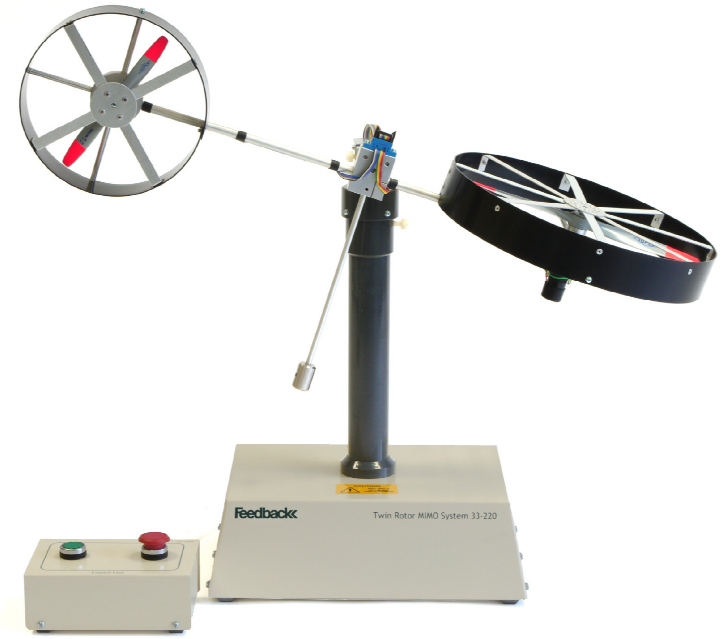
Twin Rotor MIMO

33-007-PCI



The Twin Rotor System demonstrates the principles of a non-linear MIMO (Multiple Input Multiple Output) system, with significant cross-coupling. Its behaviour resembles a helicopter, but the angle of attack of the rotors is fixed and the aerodynamic forces are controlled by varying the speeds of the motors.

Significant cross-coupling is observed between the actions of the rotors, with each rotor influencing both angle positions. 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, Data visualization.

The Phenomenological process models are designed in SIMULINK™ to provide initial models for the user to test. Model linearization is then discussed and the use of simple dynamics analysis, such as bode diagrams poles and zeros maps, are introduced. To obtain accurate models Identification procedures incorporating MATLAB™ functions are described.

The user has a chance to go step-by-step through the discrete models identification. One of the 'obtained models' is used for the Controllers design and PID control is explained. A guide is given for PID controller design, testing, tuning and implementation on the model. Root locus technique is used to illustrate the changes that PID controller tuning inflicts on the control system performance. The designed controllers are prepared in SIMULINK™.

Features

- Classic multivariable system
- Non-linear processes
- Closed loop identification
- Uses MATLAB™ control environment
- Real time analysis

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Specification

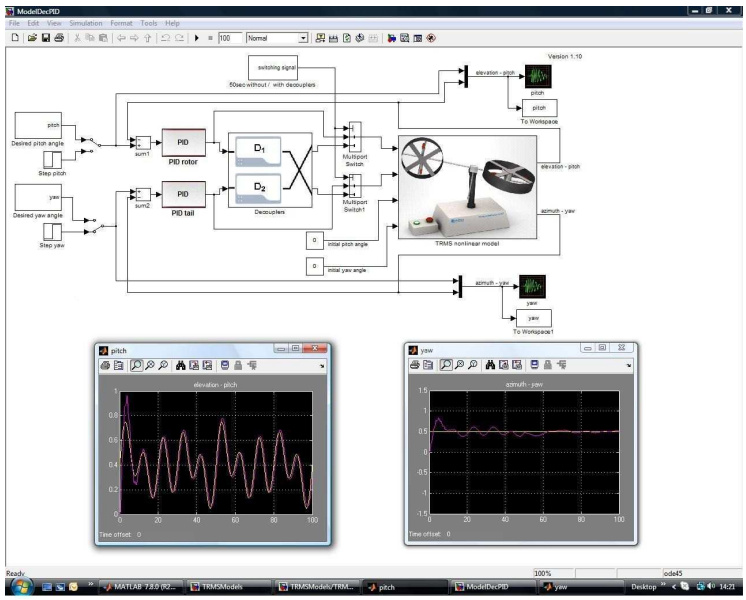
Power requirements
Line voltage: 200/250 V or 100/125 V, 50 or 60 Hz.
Consumption: 100 VA. *Fuse:* 4 A (110 V), 2 A (230 V).

Weight and Dimensions
80 cm (w) x 35 cm (d) x 75 cm (h), *Weight:* 11 kg.

Tender Specification
A MATLAB™ controlled Twin Rotor system enabling control over system dynamics, study and design of controllers.

Ordering information
Order: Twin Rotor MIMO 33-007-PCI — System with MATLAB™ interface card and cable

Order: Twin Rotor MIMO 33-007I — System **without** MATLAB™ interface card and cable



MATLAB™ screen showing schematic of control system and analysis of pitch and yaw.

Feedback Instruments
5 & 6 Warren Court
Park Road, Crowborough
East Sussex
TN6 2QX
United Kingdom
Tel: +44 1892 653322
Sales: sales@feedback-instruments.com
Website: www.feedback-instruments.com

For further information on Feedback equipment please contact ...