SEMINAR Announcement

Anti-Windup and Bumpless Transfer Controller Design

Speaker: Dr. Mark E. Pittelkau, Aerospace Control Systems, LLC
Date: Thursday, November 6, 2008
Time: 11:30 AM -12 noon; Presentation 12:12:30 PM; Discussion 12:30– 1:00 PM
Place: Fairchild Controls, 540 Highland Street, Frederick, MD 21701 Building #1
Cost: Free!
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Synopsis

Windup occurs in a controller with slow or unstable modes when an actuator saturates. When windup occurs, the controller states and output grow large and become inconsistent with the plant states and outputs. Windup can also occur when switching between controllers or when switching to manual control. Windup can cause an unacceptable response of the control system such as excessive overshoot, long recovery and settling times, and limit cycling. This is of concern in process control systems, motion control, robotics, flight control, and spacecraft attitude control systems. Anti-windup control refers to any of several design methods to prevent windup and to achieve good behavior of the control system. These methods will be reviewed and simulation results for two systems without and with anti-windup will be presented. An idea for using anti-windup control to aid in actuator failure detection will be discussed.

Mark Pittelkau is a consultant at Aerospace Control Systems Engineering and Research, LLC. Dr. Pittelkau received his B.S. and Ph.D. degrees in electrical engineering from Tennessee Technological University and his M.S. from Virginia Tech. His recent work includes attitude control system design, control-structure interaction and stability analysis, and pointing performance evaluation. His principal interests at present include attitude determination and control system design for precision-pointing of agile spacecraft, the development of algorithms and software for precision attitude determination and sensor calibration, and system identification in general. Dr. Pittelkau developed the RADICAL attitude determination/calibration filter for on-board real-time calibration of attitude sensors and gyros, automated ground-based processing, and desktop analysis and design.

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