Interaction in Decentralized Control Systems: Application to Roll-to-Roll Systems

Article

Authors

Aravind Seshadri, Pramod R Raul, Prabhakar R Pagilla

Publication Information

Conference: ASME 2012 5th Annual Dynamic Systems and Control Conference joint with the JSME 2012 11th Motion and Vibration Conference
October 1, 2012, Pages 459-466

Abstract

A procedure to analyze interaction in an experimental roll-to-roll system that uses a decentralized control strategy is presented in this paper. A Perron root based interaction metric is employed for the analysis. Experiments conducted on a roll-to-roll system are used to evaluate the interaction between different subsystems of the roll-to-roll system. To minimize interaction between subsystems of the roll-to-roll system, a procedure for designing pre-filters based on the Perron root of the system is also discussed in the paper. Experimental results with and without pre-filter clearly indicate the effectiveness of the pre-filter in minimizing interaction. Discussions regarding the roll-to-roll application, stability considerations and insights on using the Perron root based interaction measure for decentralized control applications are also given.

Link to the Article