



A GAIN SCHEDULING OF PI CONTROLLERS OF A MULTI-SPAN WEB TRANSPORT SYSTEM

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Submitted: June 2, 2016

Accepted: July 31, 2016

Published: Sep. 1, 2016

Abstract- This research aims to address the issue of controlling a multi-span web transport system by an automatic tuning of the PI controllers parameters. The use of multi-span web transport systems often requires dedicating a particular effort for defining a control system able to protect the integrity of the web. The possibility of using PI controllers for each section is attractive considering that an overlapping system decomposition may permit to take into account the mutual interaction of the neighbor sections. In this case, the choice of correct values of the PI parameters becomes crucial for the control performance. Existing fixed gain PI tension control schemes currently used in industrial practice require extensive tuning and do not provide the desired performance for changing operating conditions. This paper describes a simple strategy for automatically selecting the PI parameters of a multi span transport system by using a nonlinear interpolation of the trend of a preliminary calibration. The algorithm is simple and efficient providing fast real-time implementation, since it does not require any data processing. The proposed technique features robustness and simplicity. The implications of this method reside in its applicability in an industrial platform.

Index terms: Web transport system, Large scale systems, Decentralized control, Overlapping decomposition, Gain scheduling.