IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 5, May 2024

Enhancing the Series Cascade Control Architecture to Regulate Non-minimum Phase Systems

Navlesh Kumar[1], Prashant Garg[2], Ravindra Singh Kushwah[3]
Vikrant Institute of Technology and Management, Gwalior, India[1,2,3]

Abstract: *The paper works propose that uses a decomposed outer loop of a series cascade scheme to weave together a fractional Internal Model regulate (IMC) filter, inverse response, and dead-time compensator to regulate the non-minimum phase system. The outer loop process model is divided into two sections due to its higher-order nature. We call this process decomposition. For the inner loop and the first segment of the outer loop that has broken down, the traditional IMC controller is used. After the fractional filter, inverse response, and dead-time compensator in the IMC framework are held accountable, the controller setting for a further decomposed portion of the outer loop is obtained. The benefits of this recommended method are starting to outweigh those of the current control systems. The system's stability is assessed using the Riemann sheet principle. In addition, a robustness test is conducted using sensitivity analysis to look at the effectiveness of the suggested controller. The value of the suggested controller is illustrated by two case studies*

Keywords: Proportional integral derivative controller (PID), Internal Model Control (IMC), Fractional Order Controllers (FOC), Integer Order Controllers (IOC), Fractional PID, Cascade control, Stability analysis, Robustness analysis