IJARSCT



International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 5, Issue 6, June 2025



Design of PID Control Strategies of Cylindrical and Conical Tanks

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Abstract: This project focuses on the development and implementation of high-performance PID control strategies for cylindrical and conical tank systems. The main goal is to regulate the liquid level within a set range using a controller based on a First Order Plus Dead Time (FOPDT) model. The control strategies are evaluated using key time-domain parameters such as rise time, peak time, settling time, steady-state error, and overshoot. Various PID tuning techniques—including Ziegler-Nichols, Chien-Hrones-Reswick (CHR), and Cohen-Coon—are applied and compared. The study also highlights limitations of traditional PID tuning methods like Ziegler-Nichols, especially in achieving optimal performance in nonlinear systems.

Keywords: PID control, FOPDT model, level control, Ziegler-Nichols, CHR, Cohen-Coon, time-domain analySIS.

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DOI: 10.48175/IJARSCT-27915

