

Analysis of PI controller by model based tuning method in Real Time Level Control of Conical Tank System using block box modeling

K.Indhumathi^{1*},D.Angeline Vijula²,S.Gurunagappan³

^{1,3}**Cheran College of Engineering, India**

²**PSG Institute of Technology, Coimbatore, India**

Abstract:Conical tank Systems find wide applications in process industries because it prevents the accumulation of solid at the bottom of the tank. Control of liquid level in a conical tank is nonlinear due to the variation in the area of cross section of the tank system with its change in shape. In this paper the model of the process is identified using block box modeling and approximated to be a first order plus dead time (FOPTD) model. Also Non linear conical tank is linearized into four linearized zones based on the variation in area of CTS using piecewise linearization method. The Proportional plus Integral (PI) controller is commonly used to control the level in process industries because of its simplicity of implementation. Tuning of the PI controller is setting the proportional (K_p) and integral constant (K_I). In this paper PI controller is analyzed for Real Time conical tank system (CTS) and tuned by Ziegler Nichols method(Z-N method), Internal Model Control Tuning(IMC) and Model Reference Adaptive Control(MRAC) tuning method. The PI controller is simulated using MATLAB/SIMULINK environment and the tuning methods are implemented in real time for controlling the level in CTS.

Keywords: Conical tank system, Block box modeling, Piecewise Linearization, Ziegler Nichols tuned PI,Internal Model Control tuned PI, Model Reference Adaptive Control.