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Abstract

Measurement of level, temperature, pressure and flow parameters are very vital in all process industries. The model for such system is identified and validated. Real-time industrial processes are subjected to variation in parameters and parameter perturbations, which

sometimes makes the system unstable. Determination of tuning of the PI (Proportional + Integral) parameters continues to be important as these parameters have a great influence on the stability and performance of the control system. Most of the processes are complex and nonlinear in nature resulting into their poor performance when controlled by traditional tuned PI controllers. The need for improved performance of the process has led to the development of optimal controllers. So the control engineers are on look for automatic tuning procedures. In this work the considered non-linear process is spherical tank level process and adaptive controller is gain scheduling controller. This work proposes a Gain Scheduling Controller (GSC). For a spherical tank level process, in the case of Gain Scheduling PI controllers, the plant under consideration is assumed to be governed by a set of PI controllers with the objective to obtain good tracking behavior across the operating envelope of the plant. The PI gains are allowed to vary within a predetermined range. In the case of nonlinear plant, where the nonlinearity is the function of plant output, one strategy for achieving the desired objective is to choose the proportional ( ) and integral gains ( ) as function of the plant. The objective of the work is to design the adaptive controller for a spherical tank level process.

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Index Terms

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