

Evaluation of energy consumption in small-scale agarwood distillation pot based on averaged control signal simulation

Nurul Nadia Mohammad^a, Mohd Hezri Marzaki^a, Ramli Adnan^a, Mohd Hezri Fazalul Rahiman^a, Saiful Nizam Tajuddin^b

^a Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM), Shah Alam, Malaysia

^b Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang, Pahang, Malaysia

ABSTRACT

Water temperature of a hydro distillation process are represented by using first order plus dead time (FOPDT) model by performing a step test. From the model obtained, a PID controller have been implemented based on several tuning method includes Ziegler-Nichols, Cohen-Coon and Integral Square Error (ISE)-Load to enhance the performance of the system. In this study, a setpoint was set to 80°C and the comparative performance of PID controller with several tuning rules was evaluate and analyse via simulation. The analysis of the performance was depend on settling time, percentage of overshoot and rise time. Moreover, in this study, the average amount of control signal have been evaluated based on several tuning rules by using an integral control signal. The simulation result shows the ISE-Load that completed with minimum percentage of overshoot could result in best temperature control for hydro distillation process. However, in term of energy consumption, PID ZN gives lower energy usage.

KEYWORDS

FOPDT model; PID Controller; Step test; Ziegler-nichols; Cohen-Coon; ISE-Load; Accumulated control signal

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