

PT326 – Process Trainer

Phase 1 (Part 2)

Objectives

1. Analyse the setup as a first order system using open loop responses
2. Simulate the same responses in MATLAB using Simulink

Procedure

1. Set the switch on the left side to 'heater'
2. Adjust 'set value' to 3 V
3. Set throttle to 20%
4. Connect a function generator to port D and generate a 2 V, 0.1 Hz square wave. Observe the function generator output in oscilloscope.
5. Air temperature (V) can be measured at port Y as the output of thermistor. Connect port Y to oscilloscope to observe the air temperature (V)
6. Find gain, time constant and time delay
7. Repeat the 4 to 6 for throttle 50%, 80% and 100%.
8. Repeat 3-7 for 1 V, 0.1 Hz square wave.
9. Put values of calculated gain, time constant and time delay in following format.

Gain or Time constant or Time delay		Throttle (%)			
		20	50	80	100
Sensor location	Near to fan				
	Middle				
	Near to exit				

10. Plot throttle (%) vs gain for different sensor locations in a graph.
11. Plot throttle (%) vs time constant for different sensor locations in a graph.
12. Plot throttle (%) vs time delay for different sensor locations in a graph.
13. Simulate the recorded responses in MATLAB using Simulink and compare them.
14. Comment on the relationships between gain/time constant/time delay and throttle/sensor location.