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Setup D - Level Control in Tanks in Series

Winter 2022

Date: Jan 31st Group: 12-D

Room Temperature: 21.5°C Barometric Pressure: 660.6 mmHg

Initial conditions:

Controller	Tag	Mode	Setpoint	Notes
Primary water flow	FT - 701	MANUAL	45%	
Secondary water flow	FT - 702	MANUAL	0%	

Closed Loop Response

Controller Parameters – Set 1

K _c (%/°C)	τ_I (s)	τ_D (s)	Notes

	Before	After	Notes
	Setpoint tracking 1 (Step 7)		
Tank1 height setpoint			
Time			
$h_{\text{Tank 1}}$ (mm)			
Outlet water flowrate			

	Setpoint tracking 2 (Step 8)		
Tank1 height setpoint			
Time			
$h_{\text{Tank 1}}$ (mm)			
Outlet water flowrate			

	Disturbance rejection 1 (Step 9a)		
Tank1 height setpoint			
Secondary flowrate			
Time			
$h_{\text{Tank 1}}$ (mm)			
Outlet water flowrate			

inner tank diameter: ~~4.5~~ 8.55 cm
 tank height: 30 cm

- Delay between valve open and flow on and off
- dripping after valve shut
- water left after dumping

tank level keeps fluctuating

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	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1	30.32	517 517	
Measure 2	30.06	519	
Measure 3	30.60	520	
		Average	

→ Pressure fluctuates from inlet → external → 15-20 PSI

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	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1	30.07	657	
Measure 2	30.20	679 679	
Measure 3	30.15	643	
		Average	

tank 1: 9.45
 tank 2: 7.7
 tank 3: 5.6

→ fluctuate between 14-15 PSI

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	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1	30.30	728	
Measure 2	30.09	727	
Measure 3	30.10	716	
		Average	

tank 1: 11
 tank 2: 9.1
 tank 3: 7

→ fluctuate 14-15 PSI

85

	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1	30.2	780	
Measure 2	30.32	805 805	
Measure 3	30.0	800	
		Average	

tank 1: 9.4
 tank 2: 10.0
 tank 3: 10.1

	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1			
Measure 2			
Measure 3			
		Average	

	Time (s)	Volume (mL)	Flowrate (mL/s)
Measure 1			
Measure 2			
Measure 3			
		Average	