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% ENGR 130 Module 6.1 Report
% Section E
% November 16th, 2023
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1. Report your group's filled in Table 1, Table 2, Table 3, and Table 4.

Table 1: Open Loop Control

Final Value (RPM)	Max Overshoot %	Rise Time (t_r)	Settling Time (t_s)
499.9935	**25.5822 %**	**0.9836 s**	**5.4098 s**

Table 2: *P* Control

P	Final Value (RPM)	Max Overshoot %	Rise Time (t_r)	Settling Time (t_s)
20	**952.3930**	**67.7767**	**.2740**	**5**
40	**975.6128**	**75.7923**	**.1471**	**5.0490**
60	**983.6038**	**79.7028**	**.1207**	**5.3119**
80	**987.6655**	**82.1372**	**.1047**	**5.3054**
100	**990.0873**	**83.8530**	**.0938**	**5.0938**

Table 4: *D* Control

D	Final Value (RPM)	Max Overshoot %	Rise Time (t_r)	Settling Time (t_s)
4	**975.6098**	**32.0994**	**0.1799**	**1.1511**
8	**975.6098**	**16.5723**	**0.1615**	**0.6862**
12	**975.6098**	**9.7556**	**0.1267**	**0.5987**
16	**975.6098**	**6.3302**	**0.1099**	**0.4525**
20	**975.6098**	**4.4554**	**0.0874**	**0.1166**

Table 3: *I* Control

I	Final Value (RPM)	Max Overshoot %	Rise Time (t_r)	Settling Time (t_s)
4	**996.8911**	**2.3699**	**0.0971**	**0.1311**
8	**999.6897**	**2.2291**	**0.0970**	**0.1310**
12	**999.9783**	**2.3477**	**0.0969**	**0.1309**
16	**999.9992**	**2.4959**	**0.0969**	**0.1308**
20	**1000**	**2.6483**	**0.0968**	**0.1307**

2. What waveform characteristic does the P gain of the controller affect most?

    - The waveform characteristic that the P gain of the controller affects the most is max overshoot and rise time. These characteristics have the most significant change with the increase of P.

3. How does the D gain help the controller achieve our goal?

    - D helps to calculate how much is left before reaching the goal value which helps it slow down as it approaches to decrease the overshoot and the settling time.

4. What was your deviation from the setpoint without the I gain? Is it beneficial to use the I gain in this scenario?

    - The deviation from the setpoint was about 25 RPM without I, so it is beneficial to use the I gain in this scenario.

5. Can you think of any other devices where a PID controller is critical to use?

    - PID controller devices like heaters for your house would be a beneficial use of a control system that can adapt and recognize change in the environment. A heater with an adaptive thermostat would be able to keep the house at a proper temperature while only using the optimal amount of energy to do so.

	ENGR 130 Module Planning		Module	6	Section	E	Team	1	
			Scheduled		Actual				
#	Task	Deadline	Start	End	Start	End	Primary	Secondary	% Complete
	Type teams code for Lab 1	11/14	11/14	11/14	11/14	11/14	Karis	Lily	100
	Write algorithm for Lab 1	11/14	11/14	11/14	11/14	11/14	Trevor	Jack, Lily	100
	Double check function	11/14	11/14	11/14	11/14	11/14	Trevor	All	100
	Fill out table 1	11/14	11/14	11/14	11/14	11/14	Karis	n/a	100
	Type teams code for Lab 2	11/16	11/16	11/16	11/16	11/16	Trevor	Karis	100
	Fill out table 2	11/16	11/16	11/16	11/16	11/16	Jack	Trevor	100
	Fill out table 3	11/16	11/16	11/16	11/16	11/16	Karis	Trevor	100
	Fill out table 4	11/16	11/16	11/16	11/16	11/16	Lily	Trevor	100
	Test electrical componets	11/16	11/16	11/16	11/16	11/16	Trevor	Jack	100
	Build circut for lab 2	11/16	11/16	11/16	11/16	11/16	Lily	Jack	100
	Discuss Lab 2 Questions	11/19	11/16	11/19	11/16	11/16	Jack	Lily	100
	Type teams responses for Lab 2	11/19	11/16	11/19	11/16	11/16	Lily	Jack	100
	Assemble Module 6 Part 1 Report	11/20	11/19	11/20	11/16	11/16	Trevor	n/a	100
	Proofread Module 6 Part 1 Report	11/20	11/19	11/20	11/16	11/16	All	n/a	100
	Submit Module 6 Part 1 Report	11/20	11/19	11/20	11/16	11/16	Trevor	n/a	100
	Build the circut for Lab 3	12/4	11/28	11/28			Jack	Lily	0
	Use the osciliscope with the circut	12/4	11/28	11/28			Karis	Trevor	0
	Calibrate the Infared Sensor	12/4	11/28	11/28			Trevor	Karis	0
	Build the Puck Levitation System	12/4	11/28	11/28			Lily	Jack	0
	Control the Puck manually	12/4	11/28	11/28			Trevor	all	0
	Type code for Lab 3	12/4	11/28	11/28			Lily	Karis	0
	Discuss Lab 3 Questions	12/4	11/28	11/30			all	n/a	0
	Type Responses for Lab 3	12/4	11/28	11/30			all	n/a	0
	Type Code for Lab 4	12/4	11/30	11/30			Karis	Jack	0
	Use Oscilliscope for Lab 4	12/4	11/30	11/30			Trevor	Karis	0
	Discuss Lab 4 Questions	12/4	11/30	12/2			Lily	Trevor	0
	Type teams responses for Lab 4	12/4	11/30	12/2			all	n/a	0
	Assemble Module 6 Part 2 Report	12/4	12/2	12/2			Karis	all	0
	Proofread Module 6 Part 2 Report	12/4	12/2	12/3			all	n/a	0
	Submit Module 6 Part 2 Report	12/4	12/2	12/3			Trevor	n/a	0

Last Updated	
Jack	11/16