ELEC-313
Lab 4: DC Motor Driver

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1 Objective

The objective is to construct, measure, and observe the behavior of two common diode circuits: a voltage rectifier, and a voltage regulator.

2 Equipment

Compact L290 Motor Driver Kit	Function generator: HP 33120A
6 V DC Motor	Multimeter:
Power supply: HP E3631A	Oscilloscope: Agilent 54622D

3 Schematics

4 Procedure

4.1 Part One

4.2 Part Two

5 Results

Enable	L_1	L_2	V_{out}	LED	Motor
L	L	L	$-0.01\,\text{V}$	off	off
L	L	H	$-0.01\,\text{V}$	off	off
L	H	L	$-0.01\,\text{V}$	off	off
L	H	H	$-0.01\,\text{V}$	off	off
H	L	L	$-0.18\,\text{V}$	off	off
H	L	H	$5.7\,\text{V}$	red	CW
H	H	L	$5.5\,\text{V}$	green	CCW
H	H	H	$0.01\,\text{V}$	both	off

Table 1: Logic Table

Duty Cycle	Vout
20%	$-3.01\,\text{V}$
30%	$-3.39\,\text{V}$
40%	$-3.76\,\text{V}$
50%	$-4.13\,\text{V}$
60%	$-4.49\,\text{V}$
70%	$-4.84\,\text{V}$
80%	$-5.19\,\text{V}$

Table 2: Pulse-width modulation

6   Comparison of Results

7   Conclusion

8   Equations

$$\%_{diff} = \frac{|nominal - measured|}{nominal} \times 100\% \tag{1}$$

$$V_r = V_{max} - V_{min} \tag{2}$$

$$\%_{reg} = \frac{V_{load} - V_{noload}}{V_{noload}} \times 100\% \tag{3}$$