Lab 3 Report

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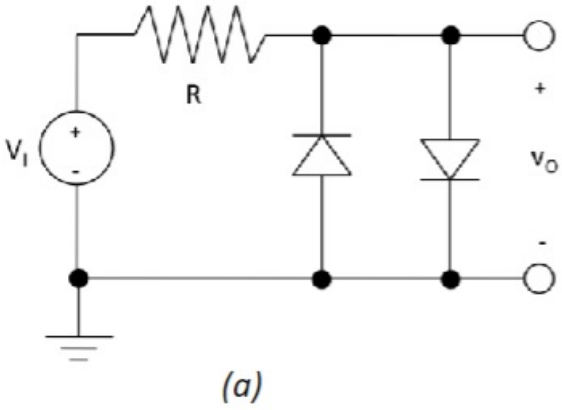
1 Circuit A - The Limiter Circuit

This first circuit is a limiter, which means that it limits the output of the circuit so that the maximums and minimums of the peaks are a little bit lower than they were before.



The circuit in Figure (A) is the limiter circuit that we built in the first lab. The resistor we used was a 10 kΩ resistor, measured at 9.998 kΩ. When supplied with an input voltage of 5 V_{pk-pk} we saw that the output voltage was decreases slightly both in our measured circuit and in the simulation. In Figure 1 we can see that the voltage of the output is reduced to just 1.41 V_{pk-pk}.

Those voltages are shown in X-Y mode in Figure 1.

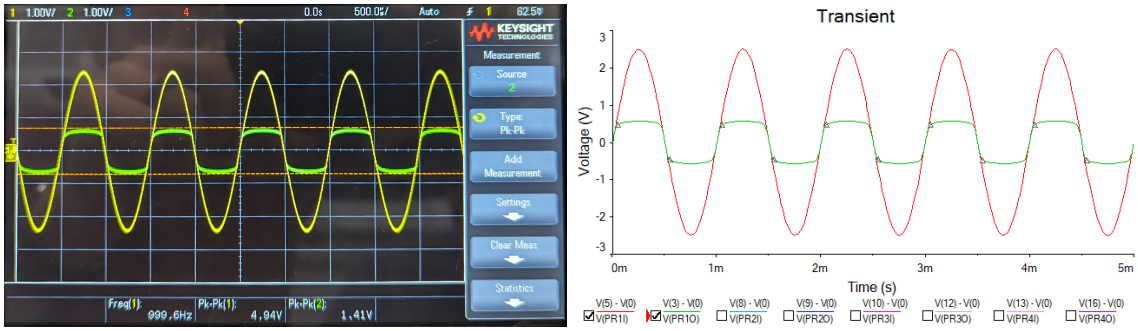


Figure 1: Measured and Simulated Results for Circuit A

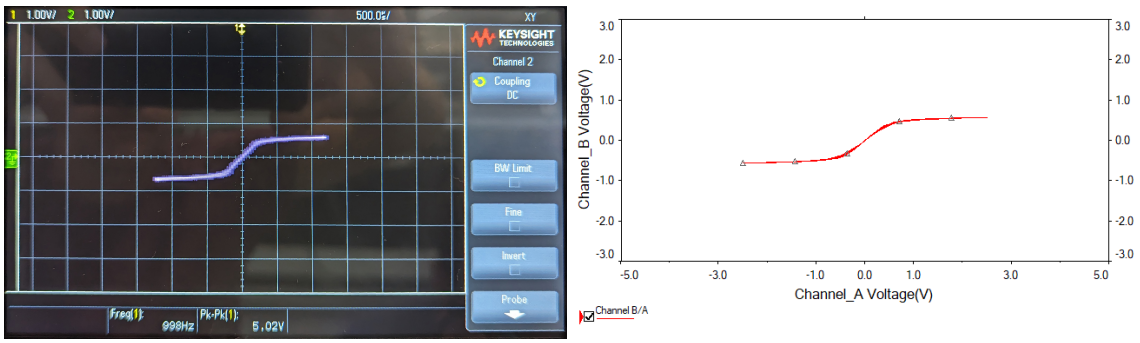
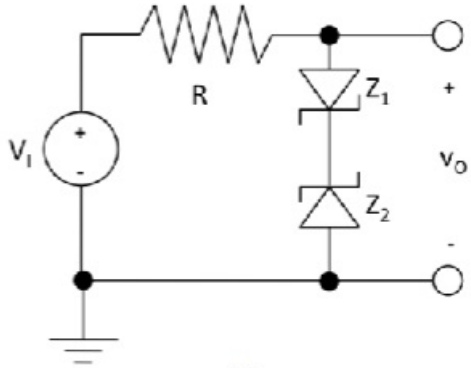


Figure 2: Measured and Simulated Results for Circuit A in XY Mode

2 Circuit B - The Zener Limiter Circuit

This is similar to the first circuit but it uses Zener diodes which operate in the breakdown voltage as their function.



(b)

The circuit in Figure (B) is the Zenode limiter circuit that we built in the first lab. The resistor we used was a 1 kΩ resistor, measured at 1.003 kΩ. When supplied with an input voltage of 15 V_{pk-pk} we saw that the output voltage was decreases slightly both in our measured circuit and in the simulation. In Figure 2 we can see that the voltage of the output is reduced to just 12.9 V_{pk-pk}.

It wasn't reduced as much as in the first circuit, but there was still a reduction when the voltage got close to its peak.

Those voltages are shown in X-Y mode in Figure 2.

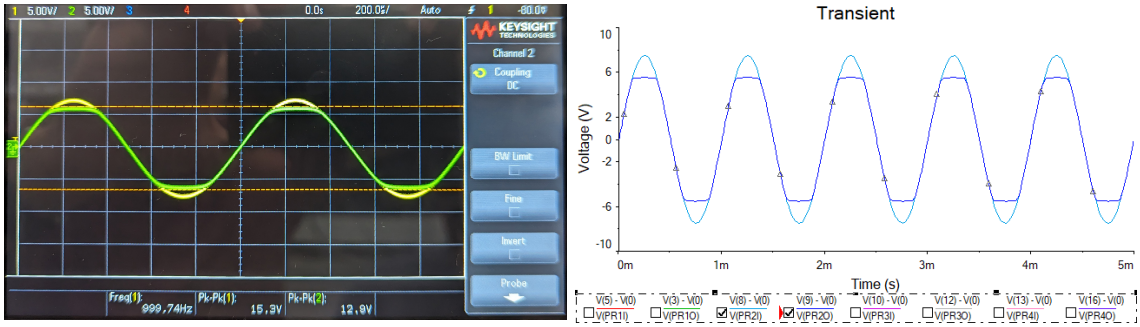


Figure 3: Measured and Simulated Results for Circuit B

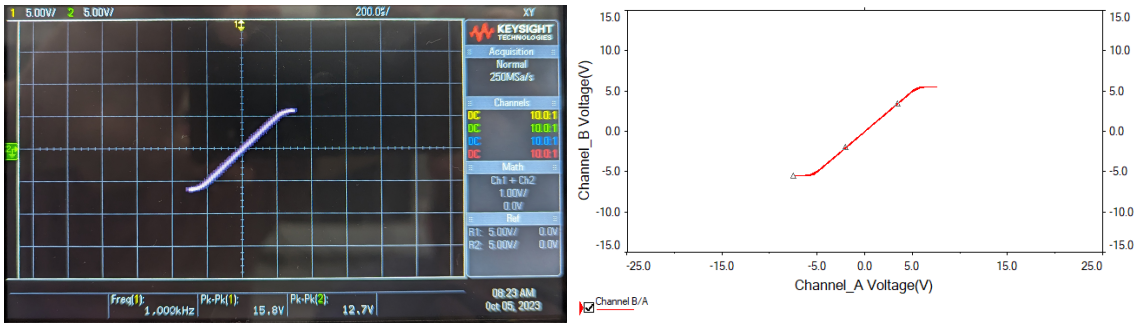
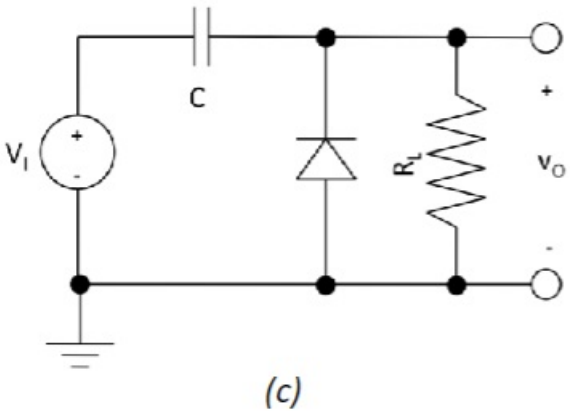


Figure 4: Measured and Simulated Results for Circuit B in XY Mode

3 Circuit C - The Clamped Capacitor Circuit



The circuit in Figure (C) is the Clamped Capacitor circuit that we built in the first lab. We fed it with a 2 V_{pk-pk} square wave and it resulted in the output shown in Figure 3

In these images the values are a little skewed, but the output voltage as a 2 V_{pk-pk} square wave but with a DC Offset of about +1 V.

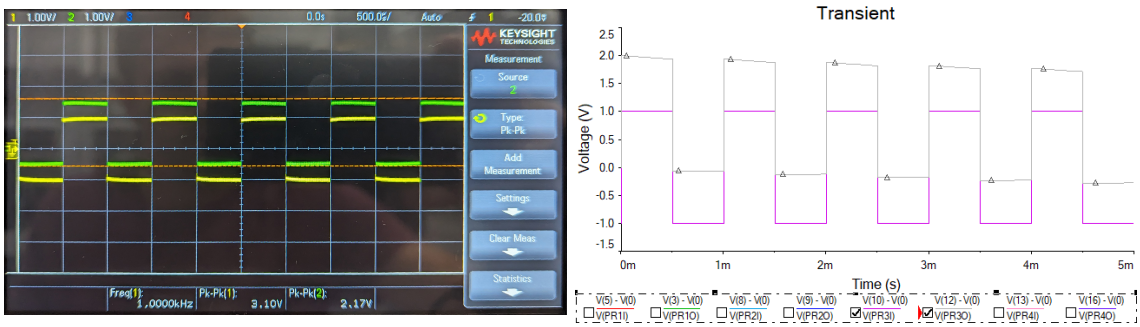
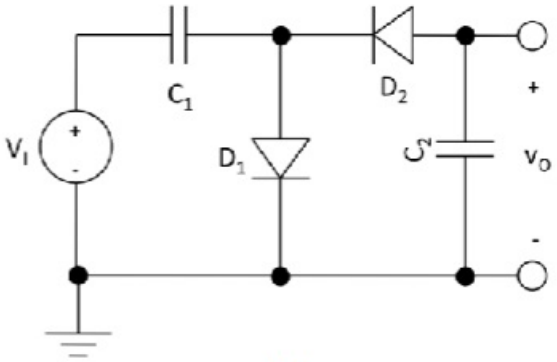


Figure 5: Measured and Simulated Results for Circuit C

4 Circuit D - The Voltage Doubler Circuit



(d)

The circuit in Figure (D) is the Voltage Doubler circuit that we built in the first lab. We fed it with a 5 V_{pk-pk} sine wave and it resulted in the output shown in Figure 4

The resulting voltage on the output is a constant DC voltage but the output is two times higher than the lowest value provided in the sine wave. So it not only converts the AC voltage to DC, but also doubles the DC value as the minimum value reached was -4.42 V, and the lowest value from the input was -2.5 V.

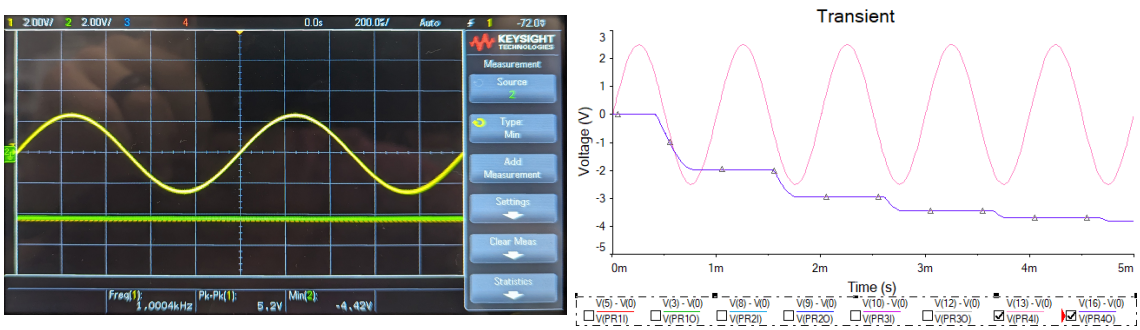


Figure 6: Measured and Simulated Results for Circuit D

5 Conclusion

Using diodes and capacitors you can make a variety of different circuits to achieve different results on the output voltages. I thought the most interesting circuits were circuits C and D because they had the most interesting affects on the input voltages.