ISIM Lab No. 1 Report: Concerning Pendulums

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1 Calibration

In this lab, I used a rotation-variable resistor to measure the swinging angle of a solid plastic pendulum rod. At 0 degrees (pendulum hanging straight down), about 0.5 V was measured across the resistor. The measured voltage decreases to nearly 0 V as the pendulum is swung to the right from 0 to +180 degrees, and increases to nearly 1 V as the pendulum is swung to the left, from 0 to -180 degrees. I first created a calibration curve (see Figure 1 below) by measuring the voltage every 20 degrees.

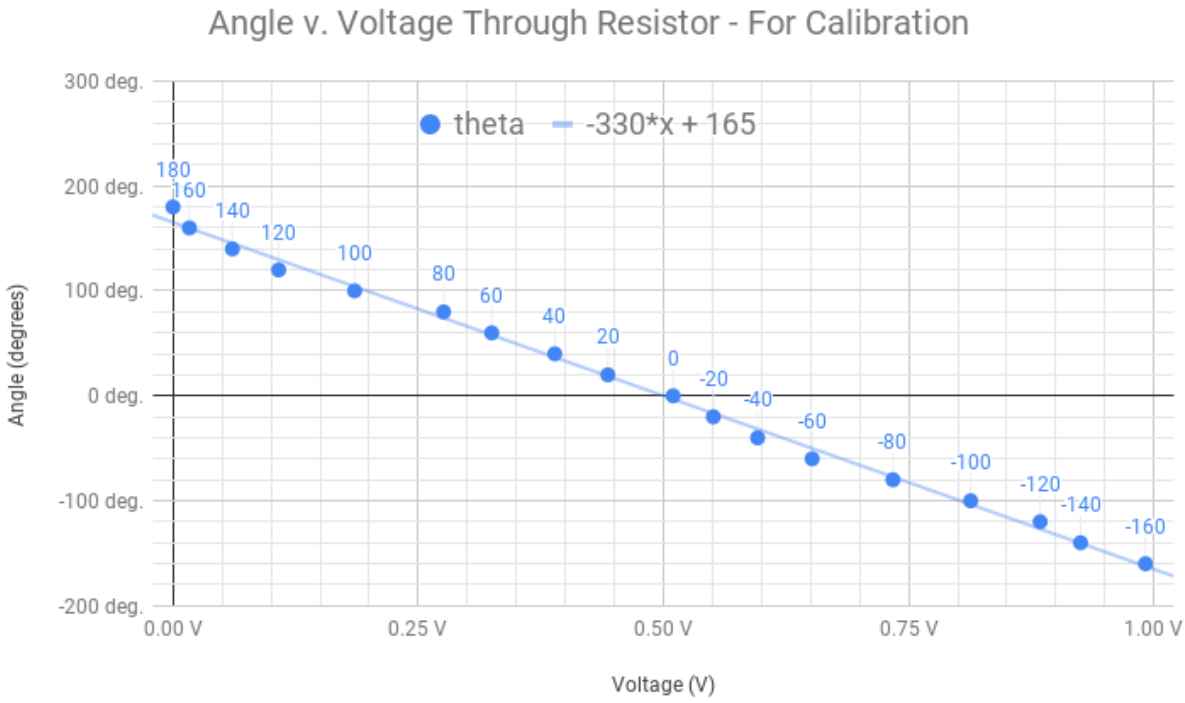

Figure 1: The calibration curve turned out to be linear, with an equation of $y = -330x + 165$ where y is the angle in degrees, and x is the voltage measured across the resistor.

2 Resulting graphs

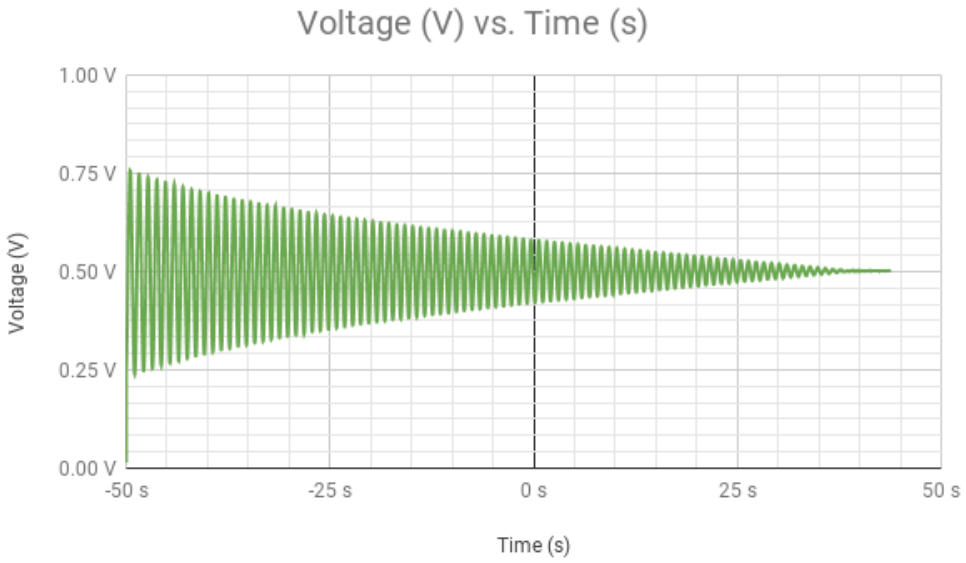

Figure 2: This is the Voltage vs. Time graph exported from WaveForms. The "Before" picture relative to the voltage-angle transformation, if you will.

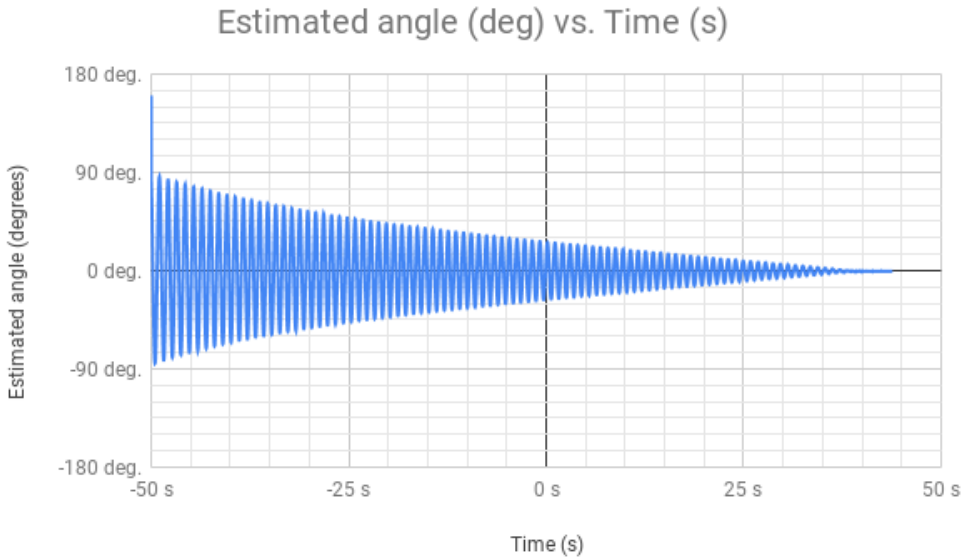

Figure 3: Finally, the "After," having used the equation given by the calibration step. For each data-point, the voltage was multiplied by -330 and added to 165 to get the approximate angle of the pendulum at that point in time. I then graphed those translated data-points.