Lab 8

Kieran Cosgrove

1. Calibration data

Chart, line chart

Description automatically generated

Slope: 0.0003214640437890054

intercept: 30.669417166613442

r^2: 0.9999819934839032

Using measurements, I was able to accurately calibrate the load cell with this linear fit curve. The sensitivity is the slope 0.0003214 N/counts. The data that created the plot above was from the following measured points:

# Create array of analog outputs

analog\_out = np.array([-98e3,-67e3,-33e3,59e3,215e3,529e3,1.47e6,3.01e6])

analog\_out = analog\_out.reshape((-1, 1))

# Corresponding masses in [gram]

mass\_grams = np.array([0, 10, 20, 50, 100, 200, 500, 1000])

1. Experiment setup is shown below – by putting a weight in series with a bungee, the force could be measured through the load cell. The force could also be estimated using the accelerometer attached at the bottom of the weight, and motion measurements could also be made using this attachment.

Diagram, shape

Description automatically generated with medium confidence

Chart

Description automatically generated



Chart, line chart

Description automatically generated

The results are very nonlinear; the first and final portions have very little displacement per force. The middle region is linear though, as the displacement is generally constant per force applied. The bungee stiffness is extremely non-linear over its entire region.