Lab 8

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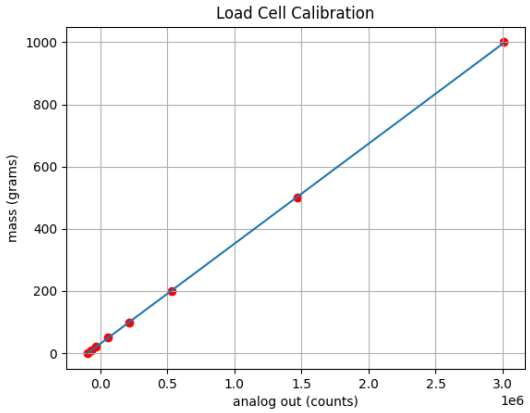
1. Calibration data



Slope: 0.0003214640437890054

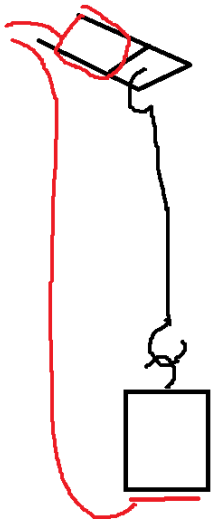
intercept: 30.669417166613442

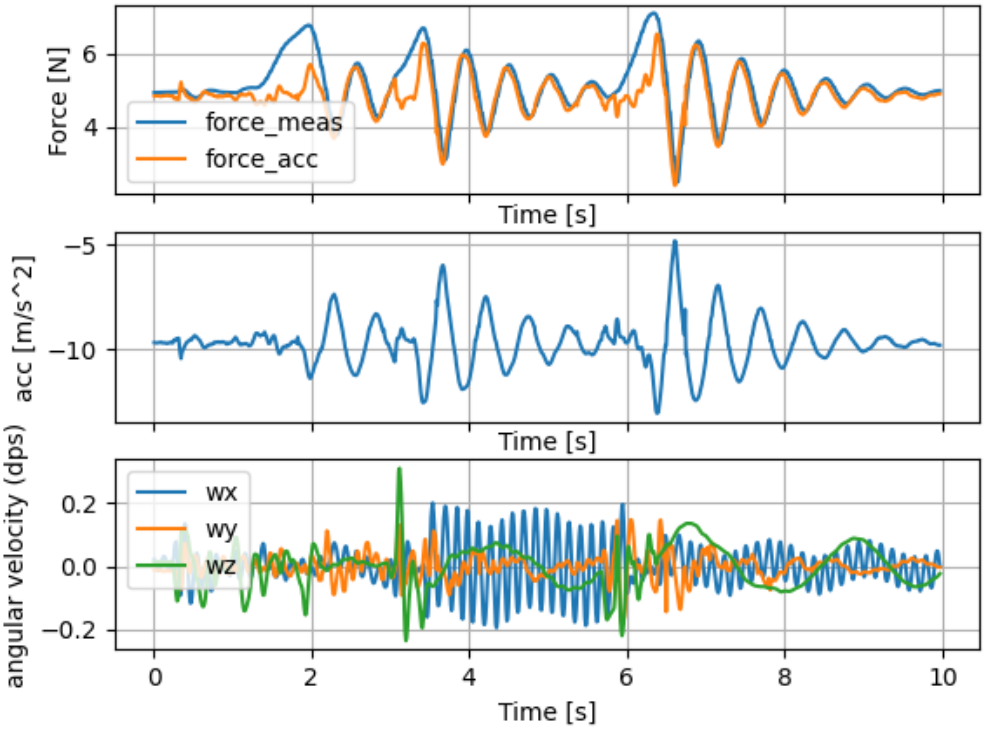
r^2: 0.9999819934839032

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:

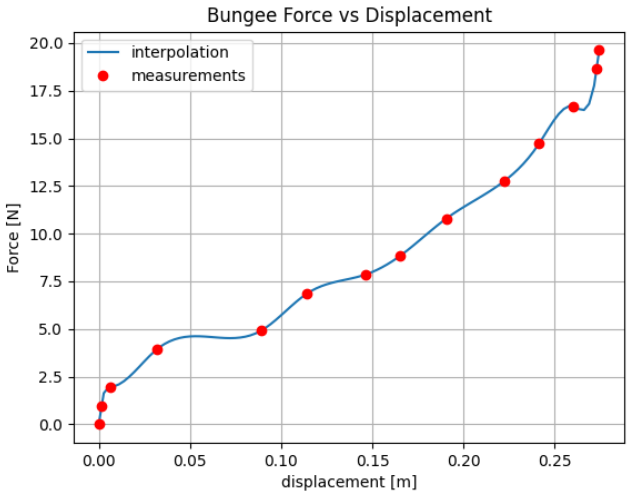
```
# Create array of analog outputs
analog_out = np.array([-98e3,-67e3,-33e3,59e3,215e3,529e3,1.47e6,3.01e6])
analog_out = analog_out.reshape((-1, 1))

# Corresponding masses in [gram]
mass_grams = np.array([0, 10, 20, 50, 100, 200, 500, 1000])
```

2. 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.





3.



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.