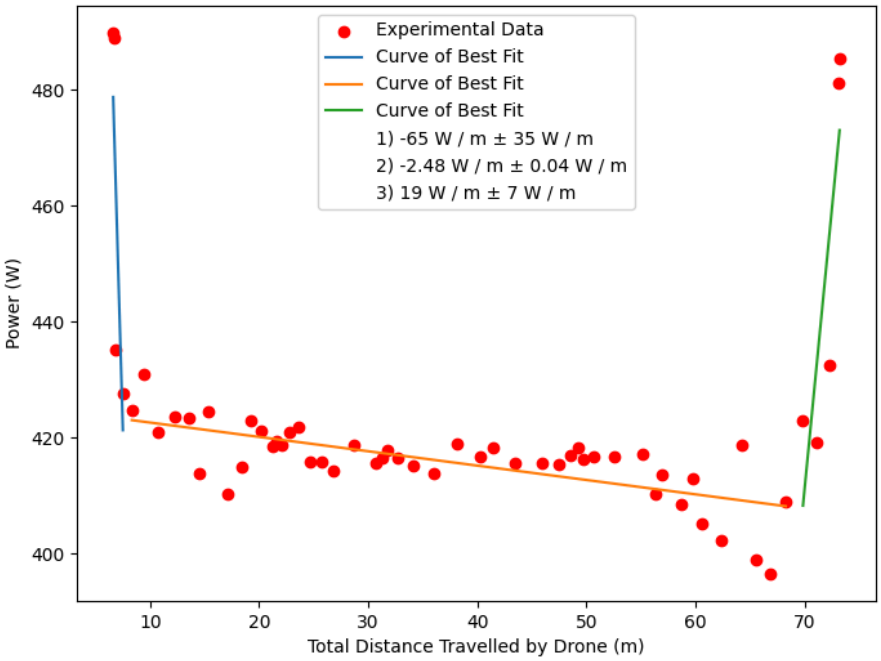
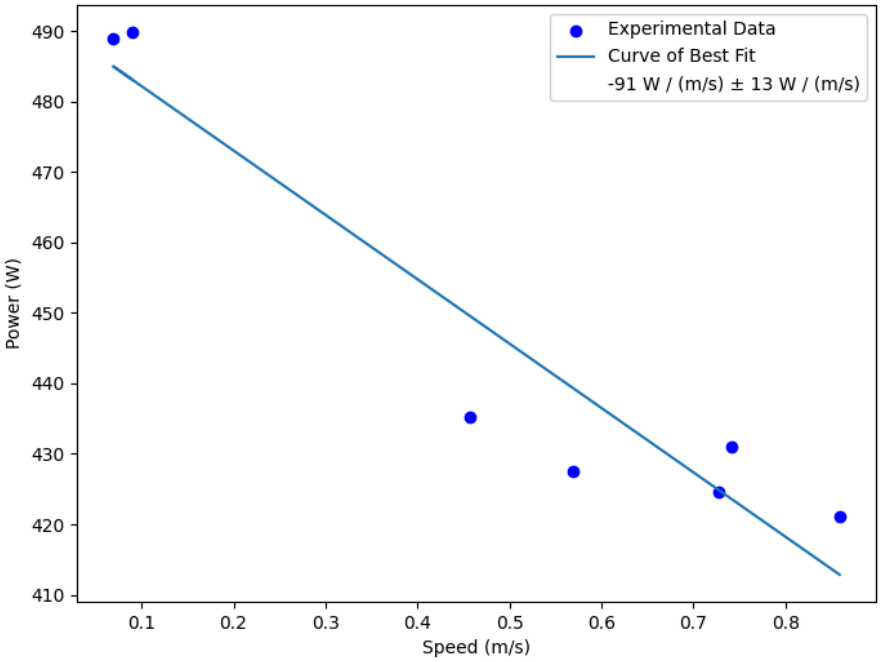
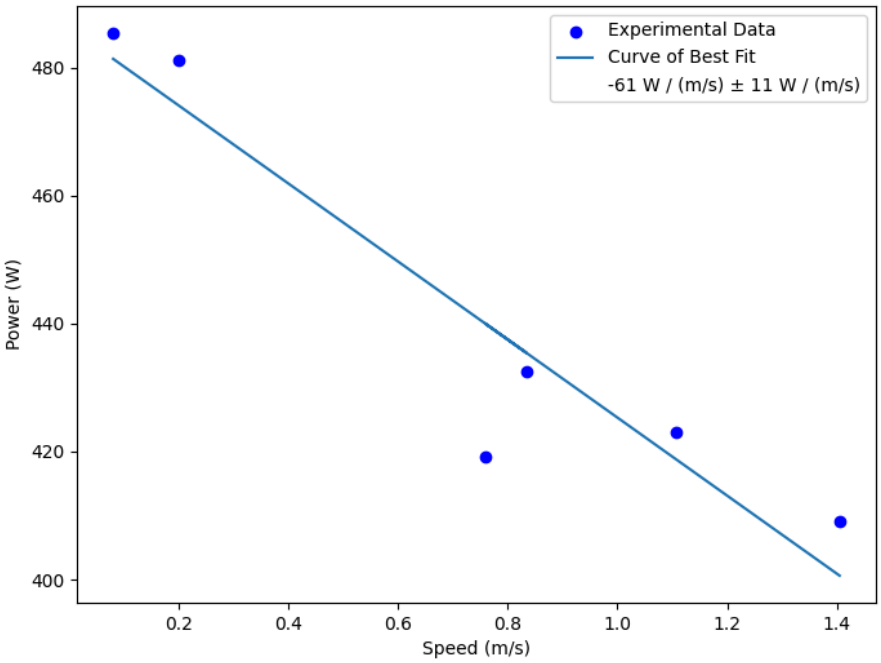
Hexarotor Analysis



- Plot of energy consumed by the drone over the total distance it covered. In order to convert the data to a one dimensional problem, the distance of the drone from the origin was considered (norm of position vector). The most notable feature of the plot is the jumps in energy consumption of the drone at the beginning and end of its flight whereas its energy consumption throughout steady flight remains relatively constant (425 W ± 1 W).
- The next two plots are of the energy consumption of the drone with respect to speed. The first being a plot of the drone's initial motion while the second is of the drone's final motion. Note that during the middle of the drone's motion, a change in speed did not significantly change the energy consumed/there were no obvious trends. In regards to the plots, they indicate that the drone requires the most energy when initializing and ending flight which is expected.
- Note the plots contain the change in energy consumed per unit of interest. Also linear models were fit to the experimental data by observing their distribution.
- It should be noted that the drone does not make any significant changes in its speed as it ranges from 0 m/s to 1.6 m/s so this is a limitation to keep in mind. In regards to further analysis, the site provides a lot of data regarding the physical motion of the drone (i.e. acceleration, altitude, etc…) but is missing any variation of payload so this is one problem I've come across.


Experimental Data
Curve of Best Fit
-91 W / (m/s) ± 13 W / (m/s)
Power (W)
Speed (m/s)
490
480
470
460
450
440
430
420
410
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8


Experimental Data
Curve of Best Fit
-61 W / (m/s) ± 11 W / (m/s)
Power (W)
Speed (m/s)
480
460
440
420
400
0.2
0.4
0.6
0.8
1.0
1.2
1.4