Methodology

Rocket flight equations

Classical rocket equation

Generating data using MATLAB

Velocity generation

Acceleration generation

During launch, the rocket experiences high values of acceleration. For our model rocket, we kept the range of the rocket’s acceleration between 0 and 16G. The data generated using MATLAB is within this range as shown in the SIMULINK model below. We inject white noise into the data to make it similar to the real data generated during flight.

References

1. <https://science.nasa.gov/learn/basics-of-space-flight/chapter3-2/>
2. Projectile motions - <https://courses.lumenlearning.com/suny-osuniversityphysics/chapter/4-3-projectile-motion/#:~:text=(c)%20The%20velocity%20in%20the,to%20the%20initial%20vertical%20velocity>.
3. Acceleration discussion - <https://physics.stackexchange.com/questions/513405/acceleration-time-graph-for-a-falling-object>
4. Parabolic equation = <https://www.csun.edu/~ayk38384/notes/mod11/Parabolas.html>
5. Exponetial functions -> <https://www.mathwarehouse.com/exponential-growth/graph-and-equation.php>