Exercises for Day 6

Exercise 1. Write a MATLAB program that approximates the area under the following increasing acceleration curve:

$$a(t) = 0.2\exp(2.1t) \text{ m/s}^2$$

Integrate from $t = 0$ seconds to $t = 5$ seconds using $N = 5$ rectangles. Print your solution nicely (including units) to a text file. (**Ans:** 1013.5 m/s)

Exercise 2. Now make your program more general: set the number of rectangles as a variable near the beginning of your code. Integrate from $t = 0$ seconds to $t = 5$ seconds using $N = 100$ rectangles. Print your solution nicely to a text file (including the value of N and the velocity with units). (**Ans:** 3280.1 m/s)

> Don't forget to change the value of the time step Δt in your code so that the integral still goes from $t = 0$ seconds to $t = 5$ seconds. You can do this by writing a line in your code that calculates Δt in terms of N.

Exercise 3. Since we chose a known function, we can figure out the analytical value of the change in velocity from $t = 0$ seconds to $t = 5$ seconds, and it is 3458.5 m/s. Keep changing N by factors of 10 in your script from Exercise 2 until the result matches the analytical value to all 5 significant digits. For this problem, just turn in your text file since the script is basically the same as for Exercise 2.