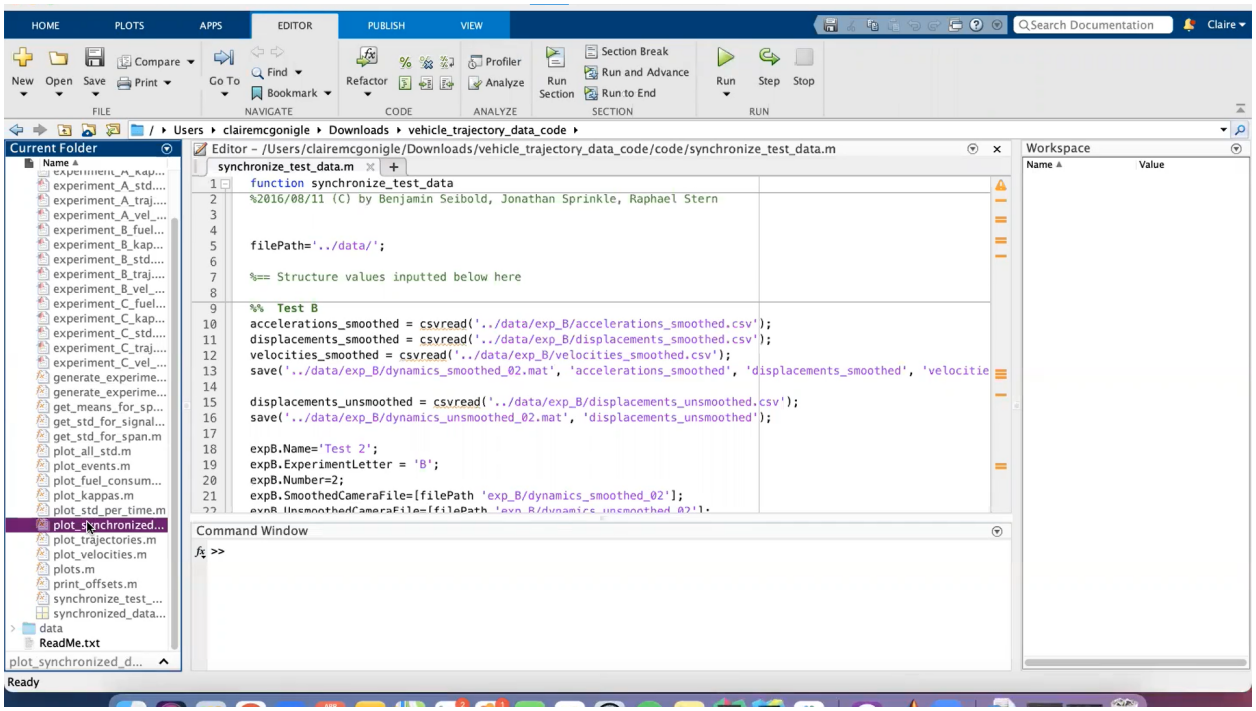
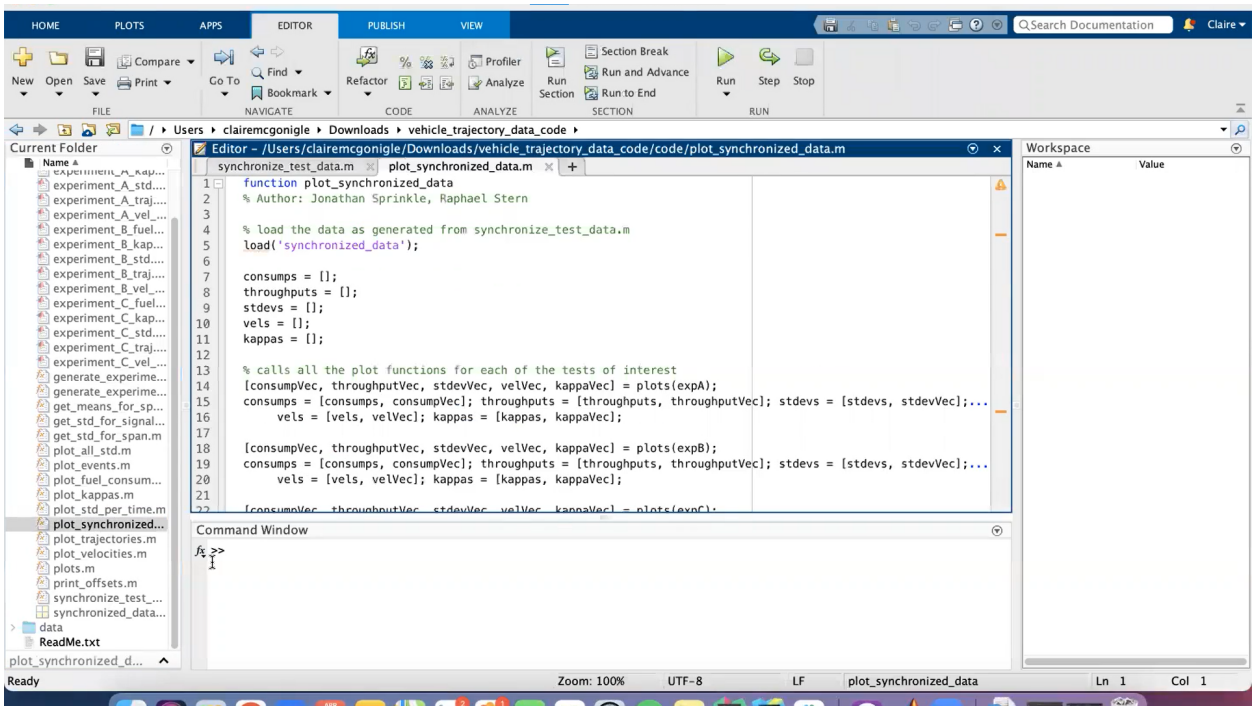
Instructions to Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB
A video tutorial is also available here.

1. If you do not have MATLAB installed, download and install MATLAB
    a. Sign in to your MathWorks account or create a new one
        i. https://www.mathworks.com/login?uri=%2Fmwaccount%2F
        ii. To access your organization's MATLAB license, use your work or university email
    b. Download and install MATLAB for your operating system:
        i. https://www.mathworks.com/downloads/
2. Download the experiment data and files (**Dissipation of Stop-and-Go Waves via Control of Autonomous Vehicles: Experimental Results: Data):**
    a. Download Data Files
3. Unzip the files from your downloads folder
4. Open MATLAB and navigate to the vehicle_trajectory_data_code folder that was downloaded in the previous step
5. Open the "code" folder within vehicle_trajectory_data_code folder
6. In the MATLAB command window, navigate to the "code" folder by running the following command: "cd <directory path>" and hitting enter.
    a. synchronize_test_data is a function that synthesizes the data. Open "synchronize_test_data" and you should see the following:



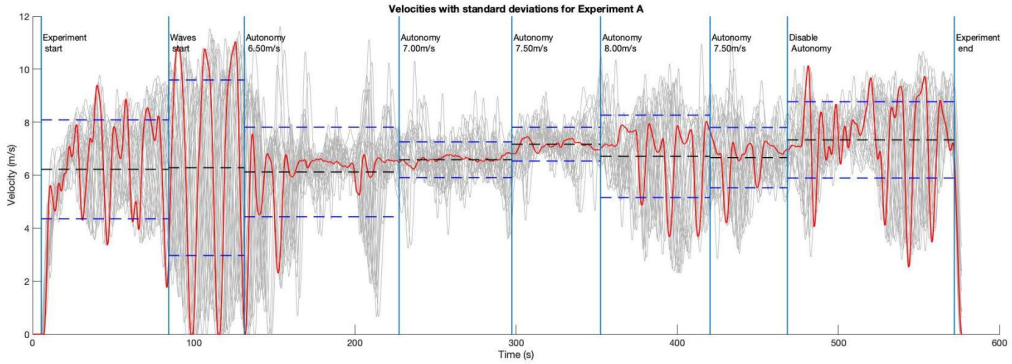
    b. plot_synchronized_data is a function that plots the output of synchronize_test_data. Open "plot_synchronized_data" and you should see the following:

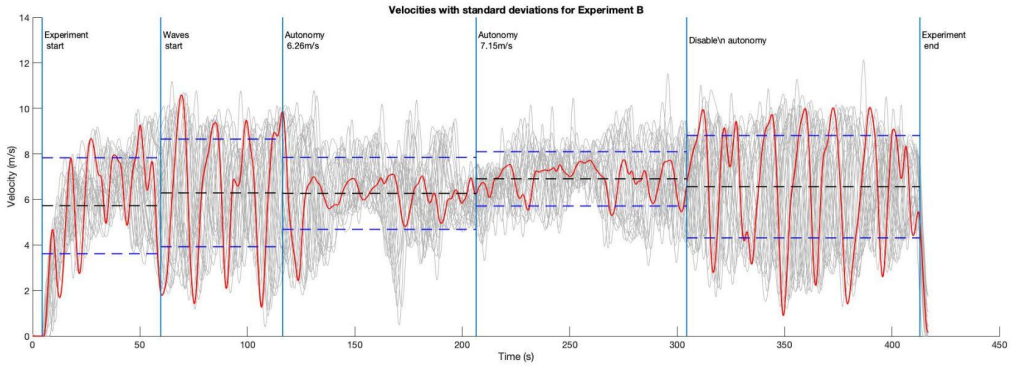


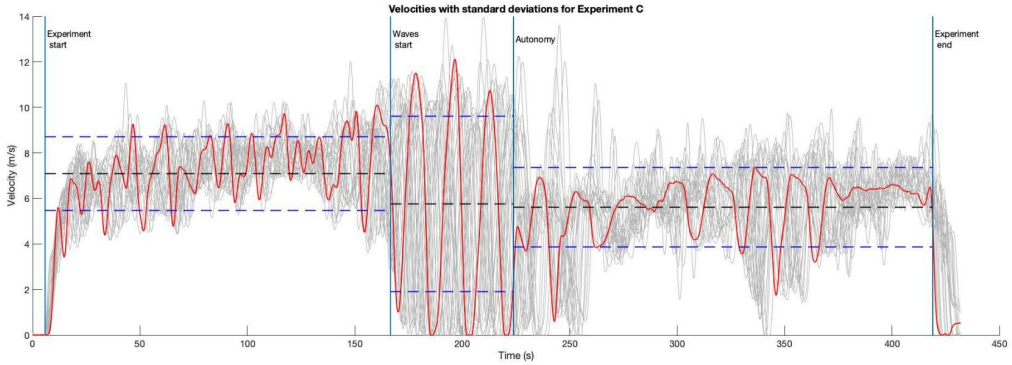
7. In the MATLAB command window, run the following: “synchronize_test_data” and hit enter
    a. This will save a file ‘synchronized_data.mat’ with a structure for each experiment conducted
    b. The output in the command window should be the following:

```
>> cd '/Users/claireemcgonigle/Downloads/vehicle_trajectory_data_code/code'
>> synchronize_test_data
Populating values for Experiment B
Using existing best index to match OBD scores is to start sampling at index 9
Populating values for Experiment A
Using existing best index to match OBD scores is to start sampling at index 35
Populating values for Experiment C
Using existing best index to match OBD scores is to start sampling at index 2
```

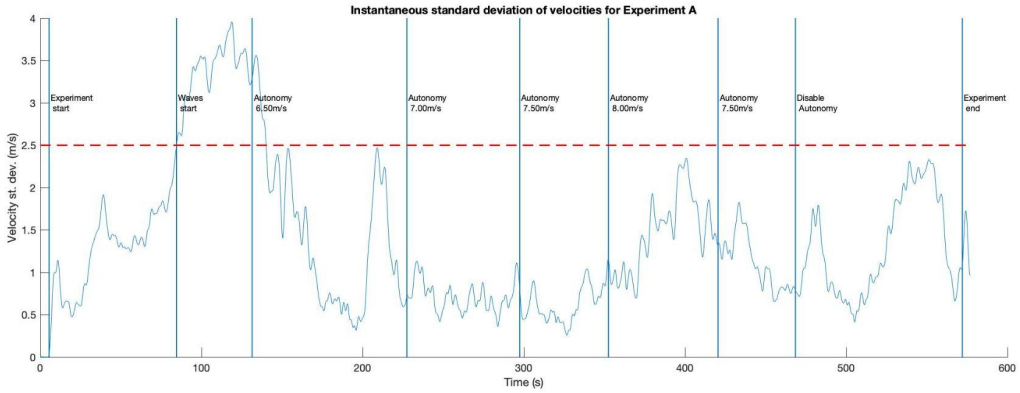
8. To plot the data, run the following in the MATLAB command window: “plot_synchronized_data” and hit enter
    a. This will create all of the figures and tables in the experiment, which are included below. These are:
        i. For experiments A, B, and C
            1. Velocities with Standard Deviations

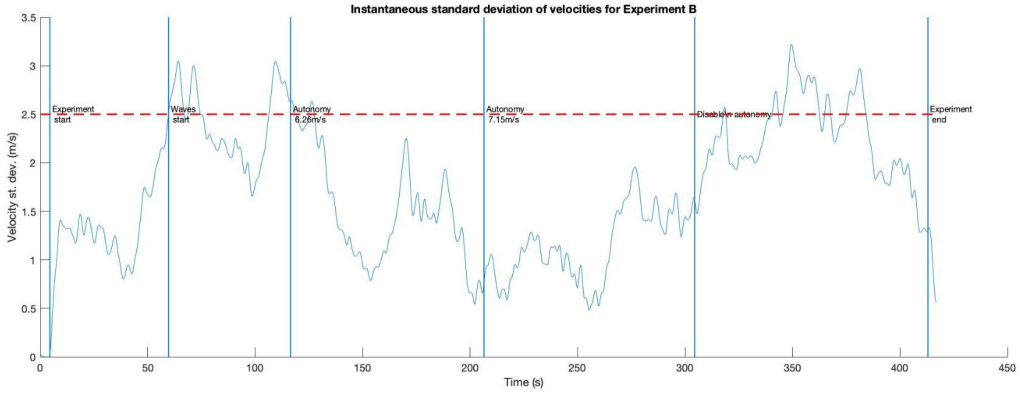


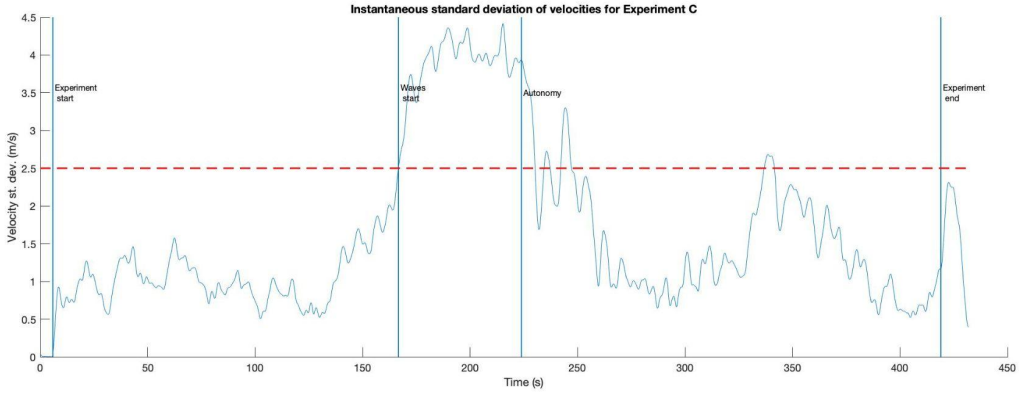




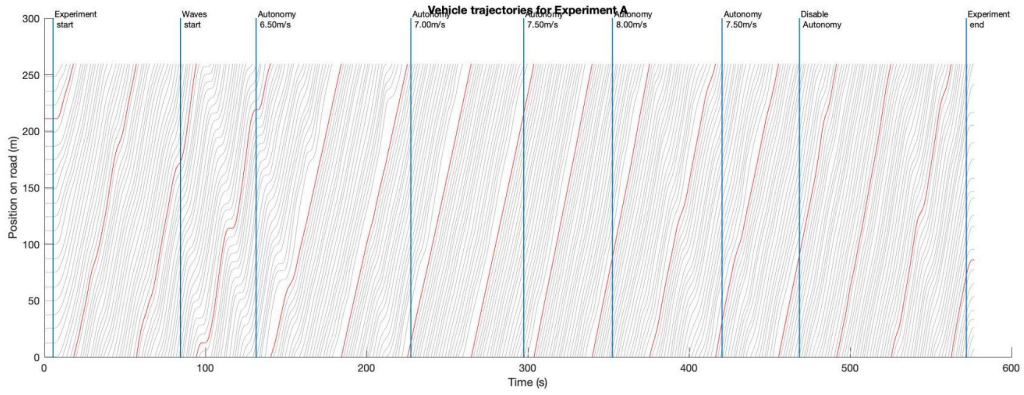
2. Instantaneous Standard Deviation of Velocities

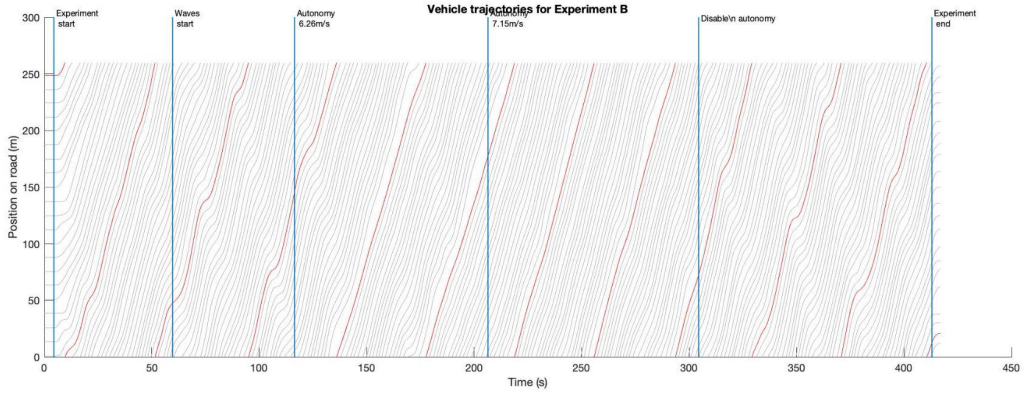


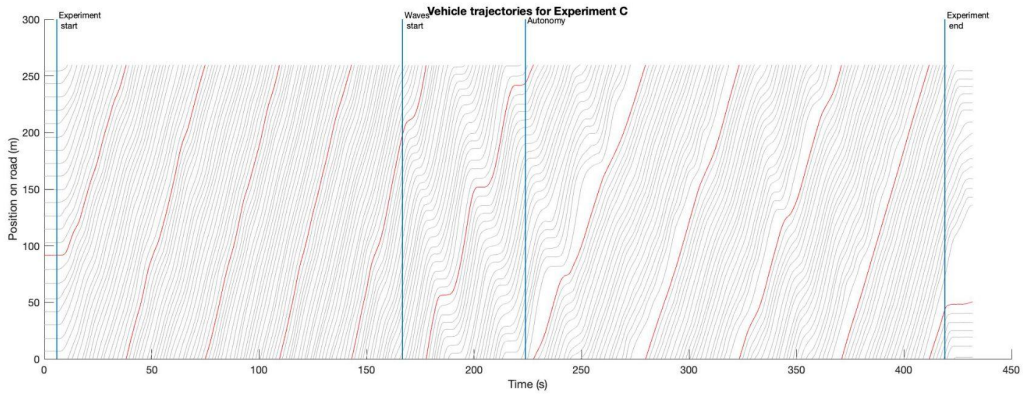




3. Vehicle Trajectories

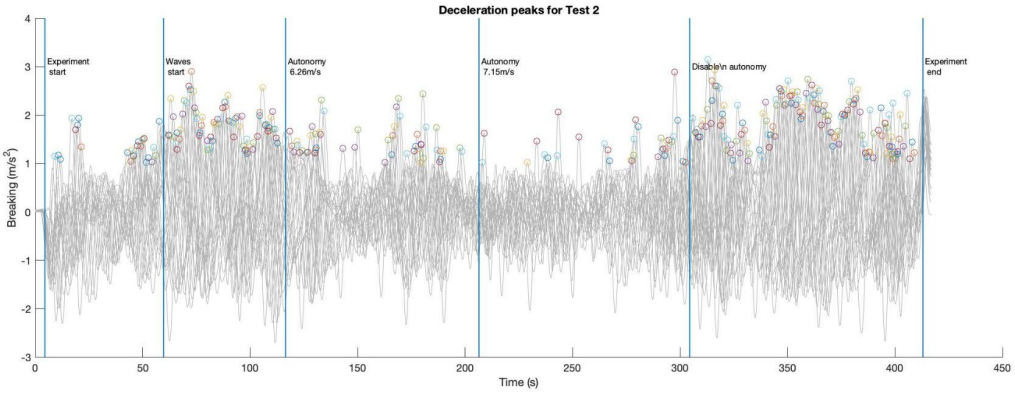


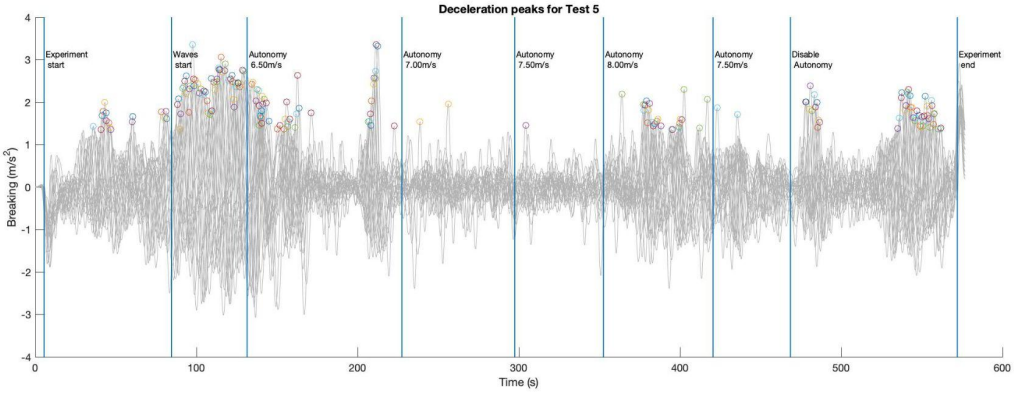


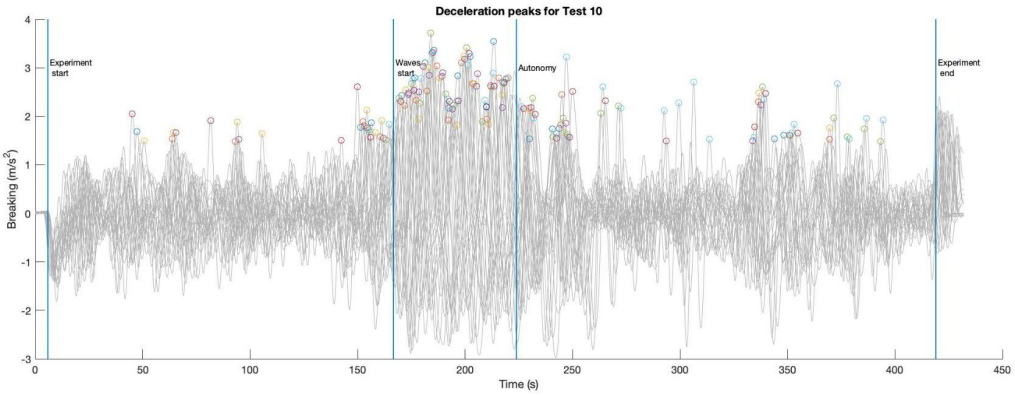


ii. For tests 2, 5, and 10

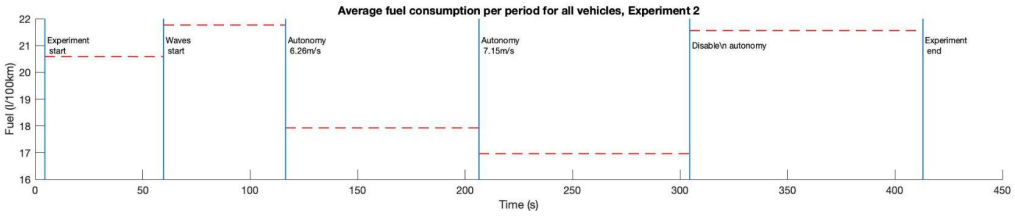
1. Deceleration Peaks

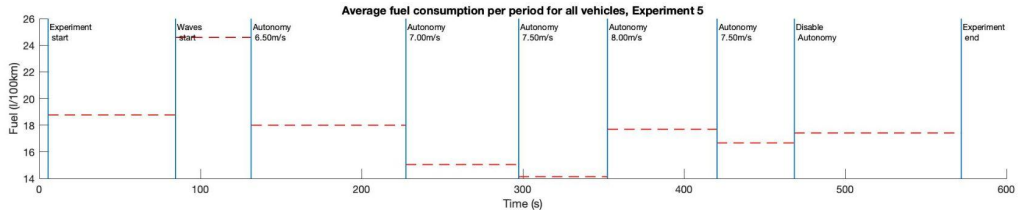


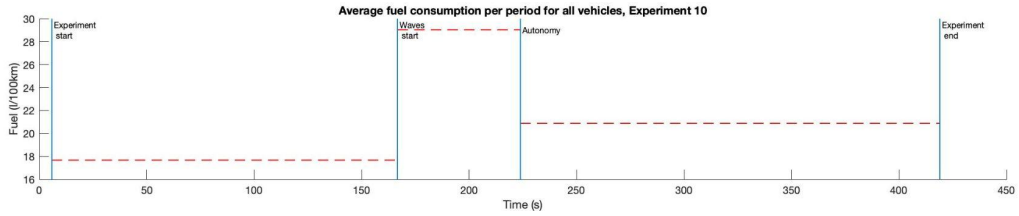




2. Average Fuel Consumption per Period for All Vehicles




Average fuel consumption per period for all vehicles, Experiment 5
Experiment start
Waves start
Autonomy 6.50m/s
Autonomy 7.00m/s
Autonomy 7.50m/s
Autonomy 8.00m/s
Autonomy 7.50m/s
Disable Autonomy
Experiment end
Fuel (l/100km)
Time (s)


Average fuel consumption per period for all vehicles, Experiment 10
Experiment start
Waves start
Autonomy
Experiment end
Fuel (l/100km)
Time (s)