How to Reproduce Our Results

We were given a large dataset and code that was supposed to use a neural network to determine the control parameters given a spacecraft’s position, mass, and velocity. We were unable to run the code due to various problems including access to libraries. Instead we used the neural network provided by Google on Google Colab. We have four separate files that map a spacecraft’s mass, x-, y-, and z-coordinates, and x-, y-, and z-components of its velocity to one of u, ux, uy, and uz which are the magnitude and direction of the control action.

In Github is a link to a Google Drive folder that contains our dataset because the file was too large to load directly. The data file is called moc\_data.npy. The first code cell in each notebook file is to load the data, and this has to be done manually. When the cell is run, a button comes up that says “Choose Files.” Press this button and select the file which will take some time to load due to its size (you probably have to download the file to your computer first). Unfortunately you have to load the data each time a file is opened in a new browser session.

After that all the cells run normally. Training the neural network takes time, but the error is printed periodically to track its progress. Each file tests three different optimizers for the network and their root mean squared errors are compared at the end. There is some randomness associated with training the networks so the results may be slightly different each time.