**Opening the GUI**

Once you open the code for the GUI in MATLAB, hit the run button (a green arrow) in the hotbar at the top of the page. The app should open automatically. If not, check your tabs because they might have been minimized.

**The Two Tabs**

The GUI has two tabs- a session tab and an overall tab. The Session tab is used to modify the joint trajectories of the six PLEGS joints - hip, knee, and ankle on each leg. The Overall tab is meant to track the patient's progress over the course of the therapy. The two tabs operate independently, so modifications on one tab do not influence the other.

Both use the same shorthand for each of the six joints - right hip (RH), right knee (RK), right ankle (RA), left hip (LH), left knee (LK), and left ankle (LA).

**The Session Tab**

The Session tab is for modifying the joint trajectories of the PLEGS. It has two graphs at the top of the page, one for the left leg and one for the right leg. Below each graph are numerical displays for the max extension and max flexion joints of each joint on that leg (rounded to the nearest whole number). There are also numerical displays that show the average work done by the PLEGS for each leg during the session. At the bottom is the dashboard, where all the editing features are included. This includes the load and export buttons, the display toggle features (for both current trajectories and original trajectories), the joint selection for modification, the modifications section, and the reset trajectories feature.

**Starting Work on Session Tab**

Before any modifications can be made on the Session tab, one needs to upload the joint trajectory file that they wish to modify. They do this by pressing the load file button on the dashboard. The file needs to be a .mat file in order for the app to open it properly. Once the file is opened, one should see the top graphs light up with three plotted lines on each graph (one for hip, one for knee, and one for ankle) as well as numbers fill in the max angle displays for each leg. If this does not happen, that means that the app did not process the file correctly.

For the plots, there is a display toggle for the three joint lines - a toggle for the hip, a toggle for the knee, and a toggle for the ankle. Once the file loads, these displays should all be checked to be on. If one does not want to see one of the three joint trajectories, simply unclick the checkbox for the joint in the display joints box.

**Making Modifications to Joint Trajectories**

Within the Modifications section of the dashboard, there are two main sections: joint selection for modifications/edits and the different tools to modify the joint trajectories. Before one can make any form of modifications, they need to select the joint they wish to modify. More than one joint can be selected if one wishes to make the same modifications to both joints. If one tries to make modifications without selecting any joints, an error message will appear.

There are several ways to modify the joint trajectories. First, there is the offset feature, which offsets the entire joint trajectory along the angle axis (y-axis), either in the positive or negative direction. This is the only edit feature that is applied to the entire trajectory line.

All other features are limited by the "direction" feature, which allows one to choose whether they want to modify the joint trajectory in the extension or the flexion direction. One cannot modify both directions simultaneously.

There are two modification tools connected to the direction feature - the gain modification and the max angle modification. The gain modification defaults to 100 percent (the current trajectory) and modifies the joint trajectory by multiplying it by the new percent value. The max angle modification sets the maximum angle to that value and scales the selected joint trajectory to never go above that set angle value.
None of these features/tools go into effect on the selected joint trajectory until one clicks the apply button in the corner of the Modifications section of the dashboard. The plots and max angles displays will be updated according to modifications once the apply button is clicked. This apply button does not reset the selected joints, so one needs to make sure they double-check the joints that are selected before applying the next modifications.
(NOTE: GAIN AND MAX ANGLE FEATURES ARE PROGRAMMED WITH HARD LIMITS TO NEVER EXCEED AN AVERAGE CHILD'S MAX RANGE OF MOTION)

**Display Original Trajectories**

Between the Load and Display section of the dashboard and the modifications section of the dashboard is the "Display Original Trajectories" section. This allows one to see the original joint trajectories prior to any applied modifications. One can either toggle just one joint trajectory (which appears as a dotted line of the same color) or all of them at once.

**Reset Joint Trajectories**

If one wants to reset any joint trajectory lines and undo their modifications, there is the reset joint trajectories section. One can select the joint trajectories they wish to reset before they click the reset trajectories button, which resets the selected trajectories back to their original trajectory lines when the file was first loaded. One must select a joint or all of them before they can click the reset button, or else an error message will appear.

**Export Joint Trajectories**

When one is finished with all their needed modifications to the joint trajectories, one can click the export button. This will export the file as a .mat file. Make sure to save this exported file as a new session/separate file from the original if one wishes to use the overall tab page of the GUI.

**Overall Tab**

The Overall Tab is meant to track the patient's progress from session to session over the course of the therapy. It does this via two main ways: tracking the change in range of motion relative to the original range of motion and the ideal range of motion across the six joints, and tracking the average percent work done by the PLEGS versus the patient for each leg. This is shown numerically in the main table in the center of the tab. Above it are two plots - one that tracks the range of motion relative to the ideal range of motion and one that shows the change in percent work done by the PLEGS/patient on each leg from session to session. Both plots have display toggles to toggle what plotted data lines are shown, to allow one to understand the plots more easily. For the range of motion plot, there is a toggle for the right and for the left leg. For the work plot, there is a toggle for the work done by PLEGS and for the work done by the patient. At the bottom of the page are the original max range of motion and the ideal range of motion (broken down into the max extension and flexion angles for the six joints).

**Starting Work on Overall Tab**

There are two main steps to set up before the overall tab can load properly. First, one needs to click the load/open folder button in the center of the page. This allows one to choose the folder

containing all of the sessions for the patient. All of the sessions need to be .mat files for the app to successfully load the folder.
Second, one must also fill in the original range of motion and ideal range of motion at the bottom of the page before the plots and table can load properly. The plot uses the original range of motion as the “session zero”.

**Export Folder**

After first opening the folder or after changing the original/ideal range of motion of the patient, click the export folder button to save these changes. Make sure to replace the original folder when doing so. If one does not export the folder or replace the original folder, one will have to retype in the original/ideal range of motion each time they load the folder in the overall tab.