BIMANUAL PLOTS

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1 Introduction

This document presents the analysis of bimanual rehabilitation robot performance using Novint Falcon devices. The study evaluates how assist-as-needed (AAN) control strategies improve trajectory following capabilities in rehabilitation applications.
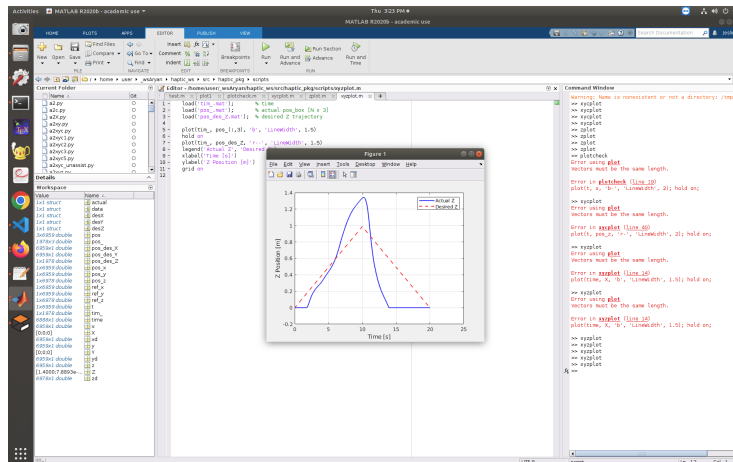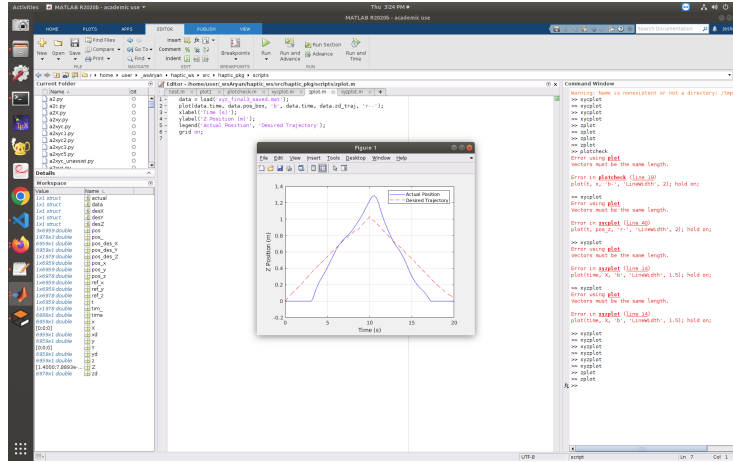
The position plots compare trajectory tracking performance between two operational modes: with assist-as-needed functionality enabled and without assistance. These plots demonstrate how the Novint Falcon devices help patients follow prescribed rehabilitation trajectories more accurately when adaptive assistance is provided.

The gain plots analyze the human and robot controller gain estimates, providing insights into the interaction dynamics between the patient and the rehabilitation system. These plots help understand how the controller adapts to patient performance and provides appropriate assistance levels.

The analysis covers movement patterns along the Z-axis (vertical movement) and X-Y axes (horizontal plane movement), offering a comprehensive view of the rehabilitation robot's effectiveness in bimanual therapy applications.

2 Position Plots

2.1 Z Axis

Figure 1: Position Plots - Z Axis With Assist As Needed

Figure 2: Position Plots - Z Axis Without Assist As Needed
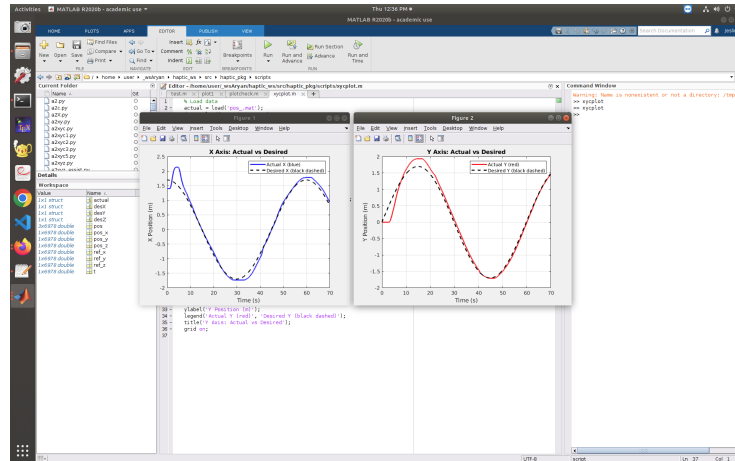
2.2   X and Y Axes

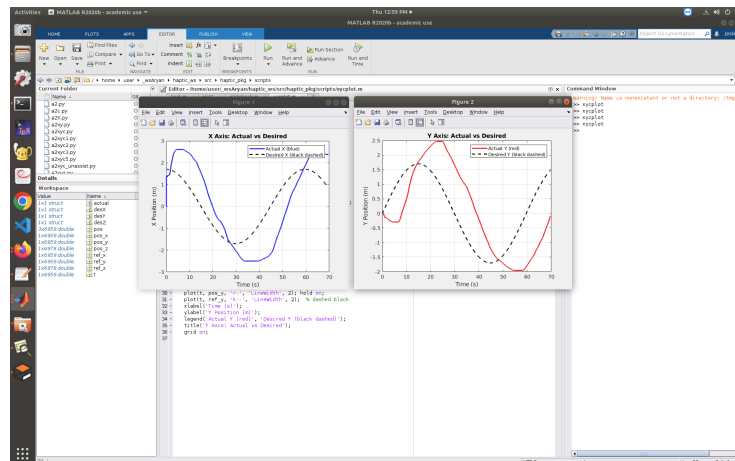Figure 3: Position Plots - X and Y Axes With Assist As Needed

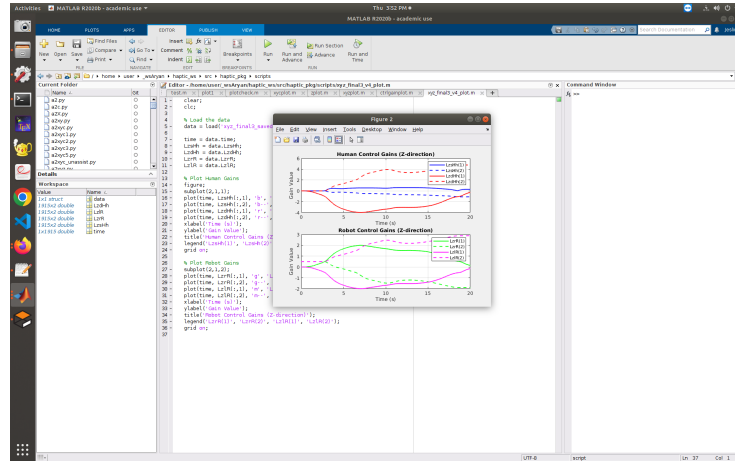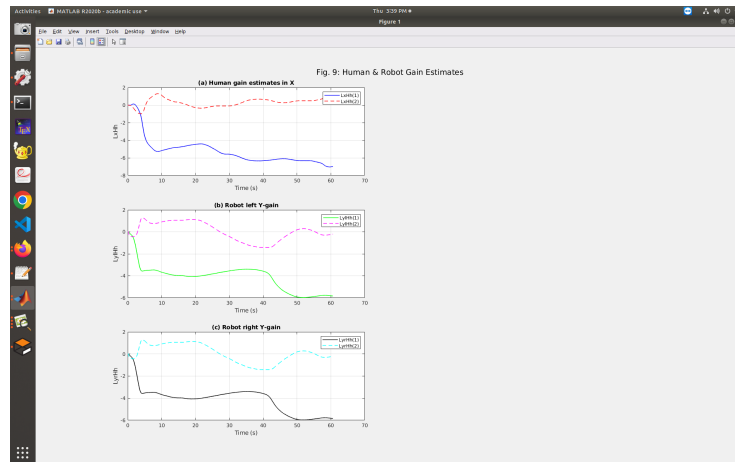Figure 4: Position Plots - X and Y Axes Without Assist As Needed

3 Gain Plots

Figure 5: Gain Plots - Z Axis

Figure 6: Gain Plots - X and Y Axes