Project Proposal 2
3-RPS Parallel Manipulator and Gantry System

*Vedvyas Danturi; Josephine Odusanya; Ashwik Manoj Tatineni*

Background

Stroke is a leading cause of long-term disability, often resulting in impaired mobility and balance. Rehabilitation plays a crucial role in restoring motor function, with a primary focus on gait training and postural stability. Traditional rehabilitation methods rely on physical therapy and mechanical aids; however, advancements in robotics and automation have introduced new possibilities for more precise and adaptive rehabilitation tools.

By leveraging its ability to make controlled, multi-axis movements, the following devices can be adapted for rehabilitation purposes, particularly for balance training and gait assessment in stroke patients.

⏸**Stage 1**: Stewart Platform
⏩**Stage 2**: 3 RPS + Gantry System
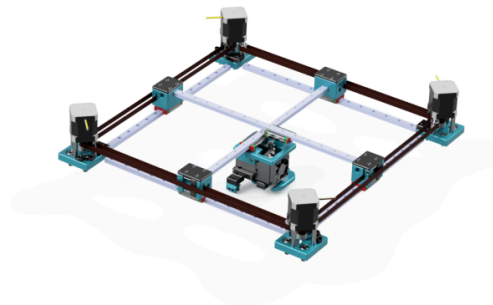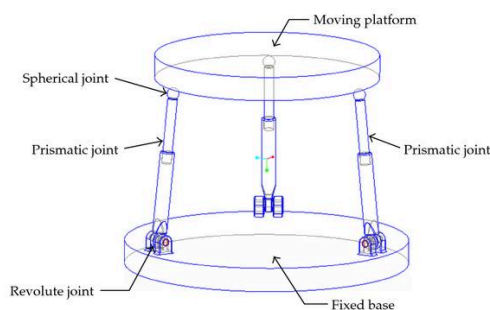
The 3RPS platform can adjust foot placement, angles, and weight shifts, mimicking natural walking motions. The gantry system provides vertical and horizontal stride support, ensuring stability and controlled movement along a predefined gait trajectory. By coordinating both systems, the patient can be guided into desired poses, facilitating rehabilitation exercises and improving motor control.

Our plan is for the platform to move in predetermined poses with the gantry emulating the foot's flexibility (forward, backwards, left, right).

Stage 3: *pending*