

KINEMATIC ANALYSIS OF STEWART PLATFORM

Abstract

The Stewart platform is a 6-DOF parallel manipulator widely used in precision positioning applications due to its high stiffness and accuracy. Its ability to achieve precise translational and rotational motion makes it suitable for robotic positioning, motion simulation, and precision alignment systems. These capabilities are highly relevant to the development and evaluation of robotic systems for remote handling applications.

This project aims to study and implement the forward and inverse kinematics of a Stewart platform. The student will first develop the geometric model of the platform by defining the base and moving platform attachment points and establishing the coordinate frames. Inverse kinematics will be implemented to compute the six actuator lengths for a desired position and orientation of the moving platform. Subsequently, forward kinematics will be developed using suitable numerical techniques to estimate the platform pose from the measured actuator lengths. If time permits, the developed models will be validated using an experimental Stewart platform.

The project will provide practical exposure to robot kinematics, coordinate transformations, and numerical methods in robotics. The work will support the understanding of precision motion systems relevant to remote handling applications.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.E./B.Tech. Electronics and Instrumentation Engineering

3) Academic Project duration:

(a) Total academic project duration: 24 Weeks

(b) Student's presence at IPR for academic project work: 4 Full working Days per week

Email to: jonnada.jayaram@ipr.res.in [Guide's e-mail address] and
project_ece@ipr.res.in [Academic Project Coordinator's e-mail address]

Phone Number: 079 -4438 [Guide's phone number]