

Control Algorithms development for Enhancing Stability in a Robotic Master arm

Abstract

Objectives: The master arm is designed for precision tasks in fields such as inspection and maintenance in nuclear machines. It requires robust stability to ensure accurate and reliable movements. This project investigates the stability of a six-axis master arm in robotic applications, focusing on its dynamic performance under various operational conditions.

Scope:

1. A combination of theoretical analysis and simulation techniques will be employed to assess the arm's behaviour under different loads and environmental factors.
2. Key parameters such as joint stiffness, damping, and payload distribution will be analysed to identify optimal configurations for stability enhancement.
3. Control algorithms will be developed and tested to improve the arm's response to external disturbances and variations in payload.
4. Advanced modelling techniques, and dynamic simulations will be used to predict the arm's performance and identify potential failure modes.
5. Experimental validation will be conducted using a prototype to compare simulated results with real-world performance.

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

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