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Topology optimization of serial link manipulator for RH application

Abstract

This project work deals with implementing and applying procedures to optimize the structure of serial link manipulator. This work addresses the problem of determining the optimal topology which maximizes the rigidity of bodies subject to local stress. This methodology provides a functional analysis of the robot in operation from a three dimensional elastic perspective with a view to deriving the best configuration. At present, the mechanical design of a robot manipulator is largely determined by the choice of joint actuator and reduction devices

This work concentrates on the structural design selected from among several alternative designs. Design objectives for the new arm include large (1-2 meter) workspace, low weight, 5 kg payload capacity, high stiffness, electrical actuation, high structural vibration frequencies, a total of three degrees of-freedom, and mechanical simplicity.

Scope of Work:

Structural design of a serial link manipulator selected from among several alternative designs. The conceptual model of a serial manipulator developed by the RHRTD division and will be supplied as an input for this work.

Project duration: 04 months

Expected Outcome:

A design methodology for optimization of serial link manipulator taking into account inertial, actuation, friction, gravitational effects and external loadings.

Number of Students: 01 (max)

Eligibility: Only students of B.E./B.Tech (Mechanical/ Mechatronics) branches can submit their application at following email addresses

Preference: Student should have exposure of CAD modeling and Analysis software.

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