

عنوان مقاله:

Optimal Design of a Novel Two-Branch Spray Painting Robot for Prescribed Process Space

محل انتشار:

مجله بین المللی طراحی پیشرفته و تکنولوژی ساخت, دوره 12, شماره 1 (سال: 1397)

تعداد صفحات اصل مقاله: 9

نویسندگان:

Meisam Vahabi - Department of Mechanical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran

Majid Ahi - Department of Mechanical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran

خلاصه مقاله:

Painting of roadside blocks manually is costly and time-consuming and can cause road accidents for workers. This paper is devoted to the optimum design of a novel two-branch robot utilized as spray painting mechanism for side and top of the roadside blocks simultaneously. Considering painting process conditions and the block displacement pattern which can change both height and lateral location along the road, clear that the process could be carried out properly by means of two nozzles. Two planar process spaces are evolved in favour of two-dimensional paths where nozzles track during the process. A conceptual architecture is formed considering the same movements that nozzles are actuated to compensate the blocks' horizontal displacements. One parallel and one serial manipulator of the robot structure a relation by common prismatic joint. Actuators are positioned close to the base of the truck so that dynamics of movable parts are to be improved logically. Due to the change in the height and lateral location of the blocks, position of joints be optimized in terms of stroke angle and process space could be best fitted into workspace, optimization problem is arisen and solved using Genetic algorithm (G.A.) which results in less angular stroke for lower nozzle and faster matching with block conditions. The optimized joint position and center of mass are far from the base, resulting in a large torque subjected to the base. To solve the problem, the joint position is shifted toward the .base without a change in the optimum situation. Finally, results are studied and detailed further

کلمات کلیدی:

Genetic Algorithm, Painting Robot, Workspace Optimization

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1008315>

