عنوان مقاله:

Regularization of the Movement of a Material Point Along a Flat Trajectory: Application to Robotics Problems

محل انتشار:

مجله مکانیک کاربردی و محاسباتی, دوره 7, شماره 3 (سال: 1400)

تعداد صفحات اصل مقاله: 11

نویسندگان:

Dinara Azimova - *L.N. Gumilyov Eurasian National University, ۲, Satpaev Str., Nur-Sultan, ۰۱۰۰۰۸, Kazakhstan*

Balgaisha Mukanova - *Institute of Information and Computational Technologies,۱۲۵, Pushkin str., Almaty, ۰۵۰۰۰۰, Kazakhstan*

Maxat Akhmetzhanov - *Al Farabi Kazakh National University, ۷۱/۲۳, al-Farabi Ave., Almaty, ۰۵۰۰۴۰, Kazakhstan*

خلاصه مقاله:

A control problem of the robot’s end-effector movement along a predefined trajectory is considered. The aim is to reduce the work against resistance forces and improve the comfortability of the motion. The integral of kinetic energy and weighted inertia forces for the whole period of motion is introduced as a cost functional. By applying variational methods, the problem is reduced to a system of quasilinear ordinary differential equations of the fourth order. Numerical examples of solving the problem for movement along straight, circular and elliptical trajectories are presented. For the sake of clarity, the problem is studied for a specific kind of a ۳D printer in the ۲DoF approximation. However, in the case of negligible masses of moving elements compared the mass of an end-effector, the solution is .universal, i.e., it remains the same for given trajectories

کلمات کلیدی:

Numerical computing, Optimal velocities, Law of motion, Predefined trajectory, Minimal inertia