عنوان مقاله:

Robotic Manipulators Cooperation Under Non-Model-Based Multiple Impedance Control

محل انتشار:

چهاردهمین کنفرانس سالانه مهندسی مکانیک (سال: 1385)

تعداد صفحات اصل مقاله: 6

نویسندگان:

Moosavian - *Associate Professor, Department of Mechanical Engineering K. N. Toosi Univ. of Technology, Tehran, Iran*

Hadi Ashtiani - *Graduate Student, Department of Mechanical Engineering K. N. Toosi Univ. of Technology, Tehran, Iran*

خلاصه مقاله:

To manipulate objects, the Multiple Impedance control (MIC) has been presented as a Model-Based algorithm that enforces a designated impedance on all cooperating manipulators, and the manipulated object itself. Although the MIC has been appeared as an efficient algorithm, but to apply model-based control laws the system dynamics has to be modeled. Furthermore, computation of the system dynamics even if perfectly known, may require considerable process time at each step for implementing the control law. In this paper, based on the modified transposed jacobian control approach, the MIC law is modified to be implemented without using system dynamics. Therefore, this modified MIC law is a quick and more realistic algorithm for implementation in cooperating robotic systems, and so is called Non-Model-Based Multiple Impedance Control (NMIC). Developing the NMIC law, error analysis shows that under the NMIC law all participating manipulators, and the manipulated object exhibit the same designated impedance behavior. Next, the proposed NMIC law is applied on an object manipulation task with two cooperating manipulators while one of them is equipped with a Remote Compliant Centre. The simulation results show good tracking performance even in the presence of impacts due to contact with an obstacle, and also system flexibility. Obtained results reveal the merits of NMIC law as a non-model-based algorithm for object manipulation tasks, which can be implemented with reasonable uncomplicated on-line computations.

کلمات کلیدی:

Cooperation, Multiple Arms, Impedance Control, Model-Based Algorithms

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