عنوان مقاله:
Multiple Impedance Control of Mobile Robotic Systems

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خلاصه مقاله:
To manipulate an object with several cooperating manipulators, the Multiple Impedance control (MIC) is a Model-Based algorithm that enforces a designated impedance on all cooperating manipulators, the manipulated object, and the moving base if applied on a mobile robotic system. To apply model-based control laws, it is needed to extract explicit system dynamic model. In this paper, using Lagrange coefficients, the non-slipping non-holonomic constraint is applied on the dynamic equations for robotic systems with free moving base. Then, the Lagrange coefficients are omitted from the motion equation by using "Natural Orthogonal Complement" method and the explicit motion equations are obtained for mobile robotic system with constrained base. By designing the appropriate path of motion, the multiple impedance law is applied on planar robotic systems with two manipulators while the moving base is driven with two differentially driver wheels. The simulation results for object manipulation with non-holonomic mobile robotic system reveal good tracking performance even in the presence of disturbances. Besides, the simulation results show that the MIC law is a robust algorithm considering dynamic parameter perturbations.

کلمات کلیدی:
Mobile Robots, Impedance Control, Cooperation