



A FRAMEWORK FOR KINEMATIC AND DYNAMIC MOTION PLANNING FOR A FORMATION OF MOBILE ROBOTS

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ABSTRACT—We present a modeling framework which combines kinematic and dynamic aspects of a motion planning task. This paper presents the control algorithms for multiple mobile manipulators cooperatively grasping and transporting an object. The planning and control tasks are decentralized, and the framework explicitly incorporates the protocols used to coordinate the robots in the team. The framework is flexible in the sense that it scales with the number of robots and controllers.

The problems of: a) motion planning (kinematic) and b) force sensing (dynamic) for a formation of mobile manipulators are decoupled. A graph theoretic approach coordinates the motion planning for the robots while stiffness matrices describe the grasping of an object. Experimental results for a team of robots are presented, and simulation results are used to illustrate the extensions of our approach to a larger team formation of robots.

Key Words: Key words: mobile manipulator, motion planning, formation, coordination of multiple robots