Adaptive Coordinated Control of Multiple Mobile Manipulator Robots Using Sliding Mode Approach: An Analog of Multi-Robot Planetary Exploration

**Summary:**
Mobile robots operating in teams will be instrumental in extending human reach in planetary exploration. To contribute in this area, in this research we propose an adaptive control for a team of mobile manipulator robots (MMRs) transporting a rigid object cooperatively under unknown parameters and disturbances. In recent years, mobile manipulators have attracted many researchers due to their combined manipulation and locomotion ability. In this project, we consider a robotic manipulator attached to a mobile platform, which can be used in planetary exploration and/or in various applications in modern factories. Some tasks, such as transporting heavy objects, are unachievable by only one mobile manipulator, and request cooperation among multiple mobile manipulators. It is anticipated that the proposed controller will be able to maneuver a group of MMRs transporting/handling a rigid object under uncertainty of parameters and disturbance, and will ensure good tracking of the desired trajectory/internal force.

![Diagram of multiple MMRs handling a rigid object](image)

**Figure 1:** Multiple MMR handling a rigid object

**Compensation for Students:** $10/hr.

**Eligibility:** US Citizen

**Skills Required:** MATLAB/Simulink, Arduino Programming