

Abstract

Ahmed Khamies El-Shenawy

Stabilizing The End-effector of a Mobile Manipulator using kinematic modeling

This paper proposes a kinematics system to stabilize and end effectors of a manipulator connected on a wheeled mobile platform. The idea to connect hybridly two different robotics systems, serial and parallel kinematics robotics systems. The inverse and forward kinematics is modeled for the wheeled platform on the velocity level, while for the manipulator the kinematics are modeled with respect to the position. For connecting both kinematics configuration, the end-effector and the robot co-ordinates were transformed to the floor co-ordinates. Simulation system was created to check the feasibility of the solution. Four simulation examples were used to test the performance of the Kinematics control based solution. The simulation result showed the feasibility and acceptable responses of the system. In addition to, a workspace on the end-effector degrees of freedom was defined and the simulation results showed the effect of violating its limits. The practical results show performance of the hardware setup to stabilize the end effector with acceptable results.