

Abstract

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Kinematics and Dynamics Analysis for a Holonomic Wheeled Mobile Robot

This paper presents the kinematics and the dynamics analysis of the holonomic mobile robot C3P. The robot has three caster wheels with modular wheel angular velocities actuation. The forward dynamics model which is used during the simulation process is discussed along with the robot inverse dynamics solution. The inverse dynamics solution is used to overcome the singularity problem, which is observed from the kinematic modeling. Since both models are different in principle they are analyzed using simulation examples to show the effect of the actuated and non actuated wheel velocities on the robot response. An experiment is used to illustrate the performance of the inverse dynamic solution practically.