

Abstract

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Solving The Singularity Problem for a Holonomic Mobile

A holonomic mobile robot with three castor wheels is presented. For each wheel, only the angular velocity is actuated. Due to the actuation characteristics, the actuated inverse solution yields singularities for some common wheel configurations. In this paper two approaches are proposed for solving this singularity problem: 1. The coupling approach is a virtual actuation for the steering angle velocity through controlling the actuated angular velocities of the other wheels. 2. The escaping singularity approach is an external function cascaded to the reference input signal in the control loop. Simulations and practical experiments are carried out to illustrate the performance of the proposed approaches.