MODELING OF A SPHERICAL ROBOT DRIVEN BY OMNI WHEELS

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Abstract

This paper mainly derives the model of the invented spherical robot using Omni wheels to drive a spherical wheel. The dynamical model is derived based on Euler Lagrange approach. The general form of the robot is also presented. It is noted that the control input of the attitude of robot body originally is the torque exerted by two pairs of Omni wheels to drive the spherical wheel, and it can be substituted with the acceleration of the spherical wheel. In other words, the acceleration of the spherical wheel will seriously affect the attitude of the robot body. It implies that the constant speed control of the spherical wheel with zero tilt can be achieved by zero acceleration. The trajectory control of the mobile robot becomes very tough, because a constant speed is not necessary to be a zero speed which is required for a fixing point trajectory control.

Keyword：Modeling; spherical robot; Omni wheels; Euler Lagrange