CONSTANT SPEED VSC OF A SPHERICAL ROBOT DRIVEN BY OMNI WHEELS

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Abstract

This paper mainly outlines 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. Therefore, based on the derived model, the variable structure control (VSC) is presented in which the sliding mode control (SMC) is adopted to achieve a constant speed at a vertical balance altitude. Simulations of the proposed control algorithm have been conducted based on two pre-determined sliding surfaces with adjustable parameters to discuss the effective time to enter the sliding surface and the convergence.

Keyword：Spherical robot; Omni wheels; Variable Structure Control; Sliding surface control