

Improvement of the lunar rover with two parallel wheels

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With raising the new upsurge for lunar exploration, the lunar rover with two parallel wheels is proposed for lunar exploration. The lunar rover is driven by the offset of the driving weight and it is selected as the subsystem of the lunar rover group system. The communication among the lunar rover group is simulated with blue-tooth technology. In the group system, the characteristic and the stability are the key problems for application. The lunar rover has simple structure and it is controlled easily, and also, it has more performance such as motion flexibility, antidumping, combinability. The lunar rover is composed of two wheels and a case platform. Each wheel is controlled independently. On the top of the case platform, CCD is used for navigation. In the front and the back of the case platform, there are docking mechanism for combination. The precise speed and position of the lunar rover is controlled by PMAC. With PC/104, the actual load such as the information of sensors and real-time communication via blue-tooth is processed. The good stability of the lunar rover is favorable for vision navigation and combination of several rovers. Focused on the stability, the lunar rover with changeable radius is proposed. Screw pair is used in the lunar rover system for adjusting the driving radius. Through adjusting the driving radius, the tilt angle of the case platform can be variant value under the same driving moment, and also the tilt angle can keep equal under the variant driving moment. For testing the feasibility of the scheme based on the simplification of the lunar rover system, the mathematic model of the lunar rover is founded and simulation is done. The simulative result shows that the tilt angle of the case platform is no more than 2.6° with the changeable driving radius and feedback control for adjust the stability of the case platform. It can meet the challenge of different movement surface.