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AUTONOMOUS OPTIMAL GUIDANCE APPROACH BASED ON NATURE PHENOMENON OF BEE ALGORITHM IN CO-OPERATIVE FORMATION STRUCTURE FOR MOON ROVERS

Abstract

In this survey a novel autonomous optimal guidance algorithm based on bee behavior in order to utilizing for cooperative formation of Moon rovers is proposed. In recent years, numerous explorers and rovers have landed on Moon and are currently exploring on Moon. Cause of the attractiveness of these missions as well as the extraordinary importance, along with the high cost of such missions, manipulating new approaches and perspectives to increase the efficiency and effectiveness of these missions is very important. Over the past years, all Moon rovers have been exploring on the surface of Moon alone and in isolation from each other. While in same times Interest in the use of formation structures in designing of space missions has increased. The formation flying with a lot of advantages plays a key role in the development and increase the efficiency of space missions. Therefore, the formation can be used to increase the efficiency of exploratory missions on Moon and Moon rovers Cooperate with each other to explore on Moon. The most prominent feature of using this approach is that instead of using large and complex rovers it is possible to make the missions done well and with some kind of work done by several smaller and easier and cheaper rovers working together. The proposed method also enhances the mission's overall reliability, and avoids the occurrence of technical failures or problems such as that caused by the Opportunity Mars rover mission life time terminate. In this way, if one rover fails, the other rovers work together so it will compensate lack of failed rover and will not take into account any losses into the general mission process. Another featured feature of the proposed approach is that sometimes a particular event occurs at a specific time and at specific location on Moon, which requires a thorough examination and it is not possible to conclude a comprehensive survey by individual rover. For these mentioned benefits, utilizing formation of rovers for exploration on surface of Moon is obvious. So for Moon rovers to work together to perform high performance, need to brilliant guidance algorithm. For this purpose in this paper, optimal guidance algorithm based on bee behavior in proposed that causes guiding of rovers formation carry out with high efficiency and effectiveness. Also applying this guidance method guaranty accomplish exploration missions on Moon with reducing overall risk that be desire for space missions designers.