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Author: Mr. Yuyang Qiao
National Key Laboratory of Science and Technology on Aerospace Intelligence Control, Beijing Aerospace
Automatic Control Institute, China, qiaoyuyang@163.com

Mr. Gang Li
National Key Laboratory of Science and Technology on Aerospace Intelligence Control, Beijing Aerospace
Automatic Control Institute, China, hugesoll@126.com
Mr. Luming Feng
National Key Laboratory of Science and Technology on Aerospace Intelligence Control, Beijing Aerospace
Automatic Control Institute, China, fengluming@126.com
Mr. Gao Xiaoying
Beijing Aerospace Automatic Control Institute, China, gaoxiaoying1021@tom.com

SPACECRAFT RELATIVE NAVIGATION METHOD FOR REPEATED MOON LANDING MISSION

Abstract

In the future of lunar exploration, landing on some complicated terrain on lunar surface becomes more and more meaningful, so some technologies such as locating precisely and avoiding hazard automatically should be developed. At present, lunar lander location error in soft landing is very serious. Although we can select a safe region in landing process, it is difficult to reduce the locating error because of the position error. After lunar base has been established, there will be more and more space transportation between the earth and the moon. Then, a precisely locating and safely landing method is a practical problem. The mentioned relative navigation system which is used for repeated moon landing mission has been proposed to reduce the burden of TTC system on the earth. Lunar landers land on the moon at the preset site under the guidance of radiation source of the earth-moon communication link in the lunar base. Lunar landers recognize the radiation source and make use of the bearing-only measurement from angle-only passive radar to locate themselves relative to the moon, and land on the moon safely. This system could be used in other solar planets and their satellites exploration. Relative navigation precision of the lunar landers has been analyzed by mathematic simulation and the feasibility of this method has been verified.