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A REVIEW ON THE APPLICATION AND KEY PROBLEMS OF SEVERAL BIONIC ROBOT
TECHNOLOGIES IN THE CONSTRUCTION OF LUNAR BASE

Abstract

With the development of astronomical technologies, a number of lunar explorations have been carried out, and a lot of valuable scientific data have been obtained, which has enabled people to have a comprehensive knowledge of the topography, resources distribution, surface environmental characteristics and other aspects of the moon. Due to the importance of lunar location and the abundance of lunar resources, many countries and international organizations have a boom in the research of the construction of lunar bases in order to establish permanent scientific research bases on the lunar surface and utilize lunar resources. However, the long distance between the earth and the moon, the unstructured and harsh nature of the lunar environment, the complexity of lunar base construction, etc. become a restriction for the lunar base construction. Many kinds of animals, such as termites, kangaroos, snakes, elephants and so on have developed special motion and behavioral characteristics to adapt their living environments in their evolution. For example, in a termite population, the transmission of pheromone between the worker termites and the queen termite will affect the stacking of soil, thus affecting the size and shape of their mound. Kangaroos can jump over large obstacles and maintain the balance of their bodies. Snakes can move freely through narrow areas by flexible body movement. Elephants, jellyfish and so on have dexterous capture mechanisms. The bionic robot technologies inspired by the activity mechanism of these animals can deal with the key problems in the construction of the lunar base, such as the movement of the robots in the complex lunar terrain, the variety and complexity of the objects being operated on, the mission assignment and negotiation between heterogeneous robots. Therefore, these technologies will strongly promote the construction missions of the lunar base and its related research and experiments. In this paper, several bionic robot technologies are selected, combining with their current research progress and application in real life, to explore their possible application in the construction of the lunar base, and the key problems are analyzed.