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A FAST FAULT RECOVERY METHOD FOR FORMATION NETWORKS OF MICRO-NANO
SATELLITES BASED ON MAXIMUM LIFETIME

Abstract

In recent years, scholars have been paid close attention to the formation technology of micro-nano satellite and make remarkable progress. In order to ensure the MnSN (Micro-nano Satellite Network) can work longer hours, it is necessary to restore the network route as soon as possible when the network link transmission failure. The traditional network fault recovery method fails to take into full consideration the actual situation of the formation network of MnSN. The path calculation times are too many or only the search for the shortest transmission path is easy to exhaust the energy of satellite nodes in advance, reducing the number of effective nodes in the network. In view of the above problems, this paper proposes a fast fault recovery method for the formation network of micro-nano satellites based on the maximization of lifetime. In this method, the master-slave logic relation and physical distance relation of satellite nodes are considered, and the energy consumed by satellite nodes and the average energy of the whole network are concerned. The distance between nodes is normalized, and the cost function is constructed according to the energy consumed by the path and the time required for the path transmission, so as to recover the fault route and maximize the network lifetime. Experimental results show that this method can effectively shorten the recovery time of routing fault of MnSN, improve the accuracy of network data transmission and the overall utilization of communication resources. Keywords: lifetime optimization; formation of micro-nano satellites; failure recovery; physical distance