SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Near-Earth and Interplanetary Communications (6)

Author: Dr. wang xiaoting
Beijing Institute of Tracking and Telecommunication Technology (BITTT), China, wxt.xiti@gmail.com

Mr. Zhao Zongyin
Beijing Institute of Tracking and Telecommunication Technology (BITTT), China, xitixiti@sina.com
Mr. Mei Qiang
Beijing Institute of Tracking and Telecommunication Technology (BITTT), China, xitixiti@hotmail.com

DISTRIBUTED QOS CONSTRAINED ROUTING ALGORITHM IN DOUBLE-LAYERED SATELLITE NETWORKS

Abstract

The LEO/MEO double-layered satellite network with inter-satellite link (ISL) bears many advantages such as high space spectrum efficiency, flexible network structure and versatile functions. However, the dynamic randomness of the network topology and the deficiency of the interlayer rout selection ability make great discounts on the system reliability and the transmission quality. On the basis of analyzing single- and multiple-layered satellite network constellation models as well as the corresponding routing strategies, a distributed QoS constrained routing algorithm in LEO/MEO double-layered satellite network is proposed, in which the game theory is employed, a unicast routing game model is built up and the QoS evaluation parameters such as the delay and the connection failure ratio requirements are combined. The results show that by applying the routing algorithm which brings in QoS indexes, the system performances could be optimized under multiple constraint conditions. The end-to-end delay bound could be guaranteed and simultaneously lower signaling overhead and higher system throughput could be obtained. At the same time, owing to the game strategy of the routing algorithm, the energy consumption of each node could achieve equilibrium and hence the robustness of the satellite network could be improved.