

多业务LEO卫星网络中最优呼叫允许控制及切换管理策略

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Optimal Call Admission Control and Handover Management Scheme in Multiservice LEO Satellite Networks

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摘要

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摘要 该文针对多业务条件下的LEO(Low-Earth-Orbit)卫星网络,提出了一种新的基于最优多门限信道预留(OMTCR)的呼叫允许控制(CAC)及切换管理策略,建立了评价LEO卫星网络连接级QoS性能的理论分析模型框架。借鉴经济学“收益函数”的概念分别建立了无QoS约束和有QoS约束的系统收益目标优化模型,求解在给定系统参数和输入业务条件下OMTCR的最优门限参数矢量。仿真结果表明OMTCR能够在不同用户QoS要求和系统收益目标的多业务环境下获得比传统CS(Completely Sharing)策略及GC(Guard Channel)策略更好的性能。

关键词: LEO卫星网络 CAC和切换管理机制 信道预留 收益函数 服务质量

Abstract: In the presence of heterogeneous traffic flows generated by services with different QoS requirements in Low-Earth-Orbit (LEO) satellite networks, a framework of Call Admission Control (CAC) and handover management scheme is proposed based on Optimal Multi-Threshold Channel Reservation (OMTCR) policy as well as its corresponding theoretic analysis approaches to evaluate the connection-level QoS metrics. To determine the optimal threshold parameters vector of OMTCR under given system parameters and input traffic conditions, the revenue concept in economics is referenced to formulate unconstrained and QoS-constrained system revenue objective optimization models. Results are presented to demonstrate the better performance of the proposed OMTCR than conventional Completely Sharing (CS) and Guard Channel (GC) policies under heterogeneous traffic conditions with different user QoS requirements and system revenue objectives.

Keywords: LEO satellite networks CAC and handover management scheme Channel reservation Revenue function QoS

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