

论文

多业务LEO卫星网络中基于改进遗传算法的最优多门限信道预留(OMTCR)机制

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摘要:

在多业务LEO卫星网络中, 最优多门限信道预留(Optimal Multiple Threshold Channel Reservation, OMTCR)机制能够从连接级对系统资源进行高效地配置, 实现用户QoS和系统整体收益之间的折中平衡。本文设计相应的遗传算法(GA)求解OMTCR最优门限参数矢量, 针对OMTCR策略对可行域及目标函数的特殊要求对基本GA进行修复, 实现快速求解; 为了避免业务类型增多和带宽提高给算法实际应用所带来的障碍, 设计小种群数的迭代GA寻优策略, 进一步减少计算量并加快收敛速度。以系统整体收益损失为评价指标, 大量的仿真结果与穷举法所得到的最优解相比, 改进GA在无QoS约束条件和有QoS约束条件下均能达到很好的性能, 并且能够显著缩短计算时间。改进GA的计算精度和收敛速度保证了OMTCR机制应用于实际系统中的可行性。

关键词: 遗传算法 信道预留 多业务 LEO卫星网络

Solving the Optimal Multiple Threshold Channel Reservation (OMTCR) Problem in Multiservice LEO Satellite Networks by Modified Genetic Algorithm

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Abstract:

In the previous work, we have constructed the Optimal Multiple Threshold Channel Reservation (OMTCR) scheme to configure the bandwidth resource in multiservice LEO satellite networks from connection level. It has been verified that the OMTCR can efficiently trade off the QoS of users and the system revenue. In this paper, we solve the optimal threshold vector of the OMTCR policy based on Genetic Algorithm (GA). The basic GA has been repaired to adapt to the particular feasible points and the objective function of the OMTCR problem. To cope with more service type and larger bandwidth, we developed an iterative GA optimizing policy with small initial population. Extensive simulation results have shown that, the modified GA significantly reduced computation time while achieving comparable performance of exhaustive search in both QoS unconstrained and QoS constrained system revenue loss optimization model. The sufficient accuracy and reasonable runtime of the modified GA ensured the practicality of OMTCR scheme.

Keywords: genetic algorithm channel reservation multiservice LEO satellite networks

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2. 王一, 杨俊安, 刘辉. 一种基于遗传算法的SVM决策树多分类方法[J]. 信号处理, 2010,26(10): 1495-1499

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