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IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advance Higher Throughput Communications and Networks for GEO and LEO satellites (3)

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MATHEMATICAL MODELING FOR NETWORK OPTIMIZATION

Abstract

Nowadays we are actually witnessing the continuous development of satellite technologies in low earth orbit (LEO). The development of technology in modern times increases the efficiency of the satellite communication system. However, problems arise during the operation of satellite communication networks. These problems can be explained by data transmission speed, density and delays. Different methods are used to overcome these problems. In this paper, existing mathematical models for solving these problems are discussed. A Cascaded Queuing Model is proposed to avoid network delays. Furthermore, an intelligent congestion control (ICC) method based on Proximate Policy Optimization (PPO) is also demonstrated to further improve the transmission rate and congestion window. Experiments to date show that the construction of mathematical models significantly improves the performance of satellite networks. This scientific work explains how existing intelligent algorithms improve the efficiency of satellite networks, how they eliminate delays, how they implement mathematical models and in which areas they are used.