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OPTIMIZING ROUTING AND NETWORK PLANNING IN SATELLITE CONSTELLATIONS USING THE FLOYD-WARSHALL ALGORITHM

Abstract

Satellite constellations have emerged as a promising solution for global coverage and connectivity. Efficient routing and network planning are crucial for optimizing data transmission, minimizing latency, and ensuring robust performance in such constellations. This paper presents a novel application of the Floyd-Warshall algorithm for routing and network planning in satellite constellations. By considering the weights or distances between satellites, including signal propagation delays and link quality, the algorithm computes the shortest paths between all pairs of satellites. It enables the identification of optimal routes, facilitates collision avoidance measures, and assists in network resilience analysis. Moreover, the algorithm aids in determining the optimal timing and coordination of satellite handovers, ensuring seamless connectivity as satellites traverse coverage areas. This research aims to contribute to the advancement of satellite constellations by providing a powerful optimization tool for network design and operation.