

Integrated adaptive approach for reliable multicast transmission over geostationary satellite networks

ABSTRACT

Multiple retransmission passes, in order to ensure bit-perfect reliability in multicast transmission, results in lower resource utilization and higher session delay. Hence, an integrated adaptive transmission via the use of a cross-layer strategy is proposed in this paper in order to increase forward and return link resource utilization. Specifically, the integration of Channel State Information (CSI) collection policies in the uplink and Channel-Aware Scheduling (CAS) in the downlink is proposed in the face of fluctuating channel conditions observed by multicast terminals. The integration approach can be mathematically represented by suppression error due to the way CSI is collected and suppressed in the return link. Particularly, the suppression error occurs since only a subset of users update their CSI values at any CSI collection instant. In relation to the analytical representation of the suppression error, the performance parameters are then verified via simulation results. From the comparison, it was found that the simulation and analytical results approach agreement at large numbers of terminals. This observation suits the multicast transmission over satellite networks which expect large numbers of terminals over wide coverage.

Keyword: Adaptive transmissions; Channel-aware scheduling; CSI collection policy; GEO satellite networks; Reliable multicast transmission