Symbol Synchronization and Resource Reuse Schemes for Layered Video Multicast Service in Long Term Evolution Networks

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Abstract : LTE (Long Term Evolution) employs the eMBMS (evolved Multimedia Broadcast/Multicast Service) protocol to deliver video streams to a multicast group of users. However, it requires all multicast members to receive a video stream in the same transmission rate, which would degrade the overall service quality when some users encounter bad channel conditions. To overcome this problem, this paper provides two efficient resource allocation schemes in such LTE network: The symbol synchronization (S2) scheme assumes that the macro and pico eNodeBs use the same frequency channel to deliver the video stream to all users. It then adopts a multicast transmission index to guarantee the fairness among users. On the other hand, the resource reuse (R2) scheme allows eNodeBs to transmit data on different frequency channels. Then, by introducing the concept of frequency reuse, it can further improve the overall service quality. Extensive simulation results show that the S2 and R2 schemes can respectively improve around 50% of fairness and 14% of video quality as compared with the common maximum throughput method.
Keywords : LTE networks, multicast, resource allocation, layered video
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