

Downlink scheduling for heterogeneous traffic with Gaussian weights in LTE-A

ABSTRACT

In Long Term Evolution-Advanced (LTE-A) networks, different aspects of radio resource scheduling such as fairness and Quality of Service (QoS) assurance must be provided for heterogeneous traffic, having different characteristics. However, the ever-growing number of mobile devices sharing the limited radio resources leads to the high cost and difficulty for information acquisition and computations in resource scheduling process. In the present paper, we propose a proportional knapsack scheduling approach for fairness- and QoS-aware downlink transmission of all different service classes in LTE-A networks. Moreover, we assess the computational cost created by the uncertainty and lack of information on user operations, and propose a Gaussian-based approach for ranking the bearers in presence of limited information and computational capabilities. This approach is particularly suitable for emerging next generation wireless networks to support a wide range of applications with huge number of users. The results indicate that significant advantages are achieved both in terms of QoS and fairness and that it is a scalable solution for overload states of the network.

Keyword: LTE-A networks; Radio resource scheduling; Heterogeneous traffic; Knapsack model; Gaussian weight