DYNAMIC INTER-CELL INTERFERENCE COORDINATION AND DYNAMIC RESOURCE ALLOCATION SCHEDULING SCHEMES FOR INTER-CELL INTERFERENCE MITIGATION IN 3GPP LTE

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ABSTRACT. *In 3GPP long term evolution (LTE), the system performance is severely hampered by the inter-cell interference (ICI) due to the frequency reuse. For this reason, 3GPP LTE is currently studying some policies to mitigate the ICI. In this paper, to mitigate the ICI and maintain the data rate of the cell edge MSs, we propose two schemes in the 3GPP LTE downlink. The first scheme is a dynamic inter-cell interference coordination (ICIC) scheme exploiting not only the interference information like RBs experiencing a high interference of the evolved NodeBs (eNBs) but also the QoS information such as the available RBs, data rate, outage of the eNBs exchanged through the X2 interface in 3GPP LTE. The second scheme is a dynamic resource allocation (DRA) scheduling scheme called the modified PF scheme. The simulation results show that the two proposed schemes play an important role in increasing greatly the data rate per MS at the cell edge without much loss of data rate per MS in the whole cell.*
Keywords: Inter cell interference, Inter cell interference coordination, Dynamic resource allocation, 3GPP long term evaluation, X2 interface

1. **Introduction.** The 3GPP long term evolution (LTE) adopting orthogonal frequency division multiple access (OFDMA) experiences the shortage of radio resource capacity at high data rate due to inter-cell interference (ICI). Therefore, efficient ICI mitigation technologies are needed. A key technology for the interference mitigation is an inter-cell interference coordination (ICIC) scheme [1]. Especially, it focuses on the interference mitigation for the cell edge mobile stations (MSs). The ICIC scheme is classified into a static ICIC scheme and a dynamic ICIC scheme. The conventional static ICIC schemes such as fraction frequency reuse (FFR) [2] and soft frequency reuse (SFR) [3, 4] adopt a frequency reuse factor (FRF) of one in the case of the cell center MSs which are relatively free from ICI. On the other hand, they use a FRF more than one in the case of the cell edge MSs which experience a serious ICI. The static ICIC schemes can lead to the spectral inefficiency and high call blocking of the cell edge MSs due to the increased ICI in dynamic loading environments. For this reason, the dynamic schemes are preferred for mitigating ICI but they consider only the interference information like resource blocks (RBs) experiencing a high interference, namely RBs with high interference indicator (HII), of the adjacent evolved NodeBs (eNBs) [5, 6]. Here, RB represents the smallest amount of resource that can be allocated in the 3GPP LTE downlink. Thus, we propose a novel dynamic ICIC scheme based on full frequency reuse system exploiting not only the interference information but also the QoS information such as the available RBs, data rate,