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## A collaborative resources control for device-to-device communication underlying LTE cellular network

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Device-to-device (D2D) communication under LTE-A system is a promising technology that can realize end-to-end communication through the reuse of cellular user resources within a cell. D2D communication can effectively reduce the load of eNodeB, however, it will also cause disturbance to the cellular communications. This paper proposes a collaborative control scheme based on power control and resource allocation for D2D with LTE networks. By comparing the target SINR (Signal to Interference plus Noise Ratio) and actual feedback SINR, it can adjust the transmission power at real-time dynamic to ensure that the receiver can receive the signal well, also can prevent wastage of too much power and interference to other devices when one device sends some data to another. The proposed study addresses collaborative resources control scheme under the D2D communication condition of the cellular communications to minimize the interferences. Therefore in aspects of resource allocation, cellular communications use RBs first, then D2D communications distribution and use of the remaining RBs. The transmission system ran out of RBs when using the D2D communication, the system can switch resource sharing mode, control in a certain range of interference to reuse cellular network's RBs, while one D2D pair can use resource from multi-cellular users applied to raise the throughput of the D2D system and the utilization ratio of the cell resources. The results show that the collaborative control scheme that we proposed does not causes serious interference in cellular networks, meanwhile ensure the D2D communication's throughput.

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