Asymmetrical Modulation for Uplink Communication in Cooperative Networks - DTU Orbit (10/01/2019)

Asymmetrical Modulation for Uplink Communication in Cooperative Networks

In this paper a spectrum efficient uplink communication method for cooperative wireless networks is presented. In cellular controlled peer to peer (CCP2P) cooperative wireless networks the mobile device is logically connected over cellular links with the base station and simultaneously over short-range links with neighboring mobile devices to form cooperative clusters. So far the physical communication over cellular links and over short-range links are separated in time or in frequency. Beyond this state of the art, we exploit a method, referred to as asymmetrical modulation, where a mobile device is generating signals that are conveyed towards the base station and the neighboring devices in the same frequency and even at the same time. The signal is composed in such a way that it has different meanings for the neighboring devices than the base station. While the base station is getting the coarse information, the neighboring devices are getting the fine grained information reading between the lines. Our analytical analysis and simulation results show that asymmetrical modulation can improve the spectrum efficiency and reduce the data queuing delay with neither degrading the symbol error rate performance nor increasing the average energy per bit.

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