

Abstract

Ehab Farouk Badran

Orthogonal codes-based dynamic spectrum access in cognitive radio networks

Dynamic spectrum access (DSA) in cognitive radio (CR) networks became a challenging research area recently. In CR technology, the DSA between primary users (PUs) and secondary users (SUs) simultaneously can be achieved without degrading the performance of the PUs by SUs interference. This can be achieved by donating incentive power to the PUs in order to compensate the interference caused by the SUs. Consequently, PUs allow SUs to share the spectrum. In this paper, orthogonal codes-based dynamic spectrum access (OC-DSA) technique is proposed. OC-DSA technique employs orthogonality between PUs and SUs transmitted data symbols in addition to the incentive power donation. Compared to other techniques, the proposed technique uses a simple encoder at the SU network for the same PU network infrastructure. By applying orthogonal codes, the interference caused by SUs is canceled and hence the donated power to incentivize the PUs is reduced. Also, the SU packet rate is increased significantly. The simulation results show that the proposed technique provides effective improvements over other existing techniques in the signal strength and the bit error rate performance of both the PU network and the SU network at the receiver side. Moreover, the proposed technique requires less donated power to incentivize the PU and has higher packet rate.