Dynamical Clustering Cooperative Spectrum Sensing with Bandwidth Constraints in CR Systems

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***Abstract*—Cooperative spectrum sensing (CSS) scheme is employed to detect the primary user (PU) more quickly and accurately in cognitive radio (CR) systems. The performance of CSS scheme is usually significantly degraded when the inter-user and reporting channels experience path loss or deep fading. Meanwhile, the reporting channels are usually bandwidth limited. When the number of the secondary users (SUs) is very large, the sensing results need enormous bandwidth in the transmission. To solve this problem, a dynamical clustering CSS scheme with bandwidth constraints is proposed, where the SUs with better reporting channels are chosen as the cluster heads and the other SUs are dynamically grouped according to the inter-user channel conditions. In each cluster, the proposed scheme adopts the double thresholds scheme to make sure that only the SUs with high quality can send their sensing results. Simulation results demonstrate that the average number of sensing bits of the proposed scheme decreases greatly with a little loss in the sensing performance. This advantage is more obvious compared with the STBC based cooperative spectrum sensing scheme.**

***Keyword*—Bandwidth constraints, cognitive radio, cooperative spectrum sensing, double thresholds, dynamical clustering**

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