基于最大特征值的协作式频谱感知

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摘　要：现有的基于渐进谱理论的频谱感知算法通常只考虑单用户感知,并且在低信噪比环境下，由于接收信号的协方差矩阵的特征值被“压缩”到 M-P 律的特征值上界附近，使噪声和信号对应的特征值难以分辨，造成检测性能下降.通过增加辅助信号，提出了多用户协作的基于最大特征值的感知算法，使目标信号对应的最大特征值右移出 M-P 律的上边界并服从高斯分布.理论和仿真结果均表明，该算法相较于现有的基于 RMT 的感知算法有更好的感知性能，并且在认知用户数或者采样点有限的情况下依旧有较好的感知性能.

关键词：　频谱感知；随机矩阵理论；最大特征值；多用户

Cooperative spectrum sensing based on maximum eigenvalue

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Abstract：　The existing spectrum sensing algorithms based on asymptotic spectrum theory usually only consider single user. And in low SNR environment, the eigenvalues of the covariance matrix of the received signal are compressed to the upper bound of the eigenvalues of the M-P law bulk. which makes it difficult to distinguish the eigenvalues corresponding to the noise and the signal, and results in poor detection performance. By adding auxiliary signals, a multi-user cooperative perception algorithm based on maximum eigenvalue is proposed, which makes the maximum eigenvalue corresponding to the target signal move right out of the upper boundary of M-P law bulk and obey the Gauss distribution. The theoretical and simulation results show that the proposed algorithm has better sensing performance than the existing RMT-based sensing algorithm, and it still has better sensing performance when the number of cognitive users or sampling points are limited.

Key words：　spectrum sensing; random matrix theory; maximum eigenvalue; multi-user

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