

认知无线网络中基于噪声功率估计的能量检测性能

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Performance of Energy Detection Based on Estimated Noise Power in Cognitive Radio Networks

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摘要

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摘要 该文分析了利用噪声功率估计值进行能量检测时判决门限的计算问题,推导出检测性能的Q函数表达式。为达到期望的检测性能,判决门限不能直接由噪声功率估计值替换已知的噪声功率得到,必须进行修正。文中给出了修正判决门限的闭合表达式,极大地简化了检测性能分析和判决门限计算。仿真结果表明,在估计样点数为20时,对比原判决门限,基于修正判决门限的误警概率减少了15%,有效地提高了认知无线网络的吞吐量。

关键词: 认知无线电 频谱感知 能量检测 噪声功率估计

Abstract: This paper analyzes the issue of calculating the threshold for energy detection when an estimated noise power is used. The corresponding closed-form detection performances of energy detection are derived in the terms of Q function. To achieve the expected detection performance, the threshold cannot be derived by replacing the exact noise power with the estimated ones and must be modified. Moreover, the closed-form expressions of modified thresholds are given in this paper, which simplify the analysis of the detection performances and the calculation of the threshold. Simulation results show that when the sample number is 20, compared to the original threshold, the false alarm probability based on the modified threshold decreases 15%. The throughput of Cognitive Radio (CR) networks can be effectively increased.

Keywords: Cognitive Radio (CR) Spectrum sensing Energy detection Estimated noise power

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