An Improved Spectrum Sensing Algorithm Based on Random Matrix Theory

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***Abstract*—Spectrum sensing is an essential problem in cognitive radio. Blind detection techniques such as the algorithm based on random matrix theory which is shown to outperform energy detection especially in case of noise uncertainty, sense the presence of a primary user's signal without prior knowledge of the signal characteristics, channel and noise power. In this paper, we improve the maximum and minimum eigenvalue algorithm from two aspects. Using some recent random matrix theory results, a new threshold based on the distribution of minimum eigenvalue is introduced first. Then the signals received by each cognitive user are decomposed into I and Q components to ensure maximum exploitation of signal correlation among the temporal, spatial and phase correlation (between I and Q components) present in the received signals. Numerical simulations show that the proposed detection rule perform better than the traditional eigenvalue-based algorithm while also proving to be more robust.**

***Keyword*—Cognitive radio, spectrum sensing, random matrix theory, distribution of minimum eigenvalue, I and Q components.**

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