A Cooperative Spectrum Sensing Algorithm Based on Leading Eigenvector Matching

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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 propose a cooperative spectrum sensing method based on the Leading Eigenvector Matching (LEM). LEM detector uses the feature blindly learned from Feature Learning Algorithm (FLA) as prior knowledge. The correlation coefficient between feature learned and leading eigenvector of sample covariance matrix serves as the test statistic for signal detection. The closed-form expression of the threshold is also derived in this paper. Numerical simulations show that the proposed detection algorithm performs better than the MME algorithm while also proving to be more robust and it does not suffer from a noise power uncertainty problem.**

***Keyword*—Cognitive Radio, spectrum sensing, covariance matrix, leading eigenvector, feature learning.**

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