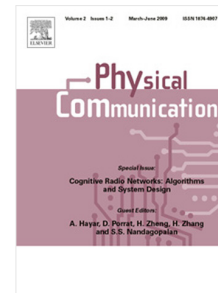


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MIMO Relaying Networks for Cooperative Spectrum Sensing : False Alarm and Detection Probabilities

Imen Souid^a, Haithem Ben Chikha^{a,b,*}, Iyad Dayoub^c, Rabah Attia^a

^a*Carthage University, SERCOM laboratory, Tunisia Polytechnic School, 2078 La Marsa, Tunisia.*

^b*Al Jouf University, Computer and Networking Engineering Department, College of Computer and Information Sciences, 72388 Sakaka, Saudi Arabia*

^c*Univ. Lille Nord de France, IEMN-DOAE, CNRS UMR 8520, F-59313 Valenciennes, France*

Abstract

In this paper, we investigate spectrum sensing in cooperative networks. Hence, in order to enhance cooperative sensing, we propose a novel model based on multiple-input multiple-output (MIMO) relaying broadcast channels with direct link and cognitive radio technology. Despite their efficiency in increasing transmission rates and networks capacities, MIMO relays have not yet been exploited for enhancing spectrum sensing. In this case, each relay is equipped with many antennas and the primary signal samples are collected by both MIMO relays and secondary user. Furthermore, we derive new expressions for the false alarm and detection probabilities as well as the detection threshold. Performance analysis are made for both soft and hard cooperative spectrum sensing schemes. Considering Gaussian and impulsive noise environments, simulations show that the proposed model allows a significant detection performance gain compared to non-cooperative cognitive MIMO models.

Keywords: Cooperative spectrum sensing, Detection threshold, False alarm and detection probabilities, MIMO relaying networks.

*Corresponding author.

Email addresses: imensouid16@gmail.com (Imen Souid), h.benchikha@gmail.com (Haithem Ben Chikha), iyad.dayoub@univ-valenciennes.fr (Iyad Dayoub), attia.rabah@enit.rnu.tn (Rabah Attia)

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