

Improving cooperative spectrum sensing under correlated log-normal shadowing

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Abstract: It is well known that exploiting spatial diversity via cooperation of many cognitive radios leads to an increase in energy detection reliability. This is because the probability that many radio channels concurrently experience the worst shadowing and fading channel conditions decreases as the number of cooperative CRs increases. Compared to multipath fading, shadowing effects tend to produce weak and correlated received signals, hence reducing spatial diversity gain over a much larger distance, depending on the characteristics and the size of the obstruction. The motivation of our paper is that because signals received by neighboring CRs subject to shadowing by the same obstacle or cluster of obstacles are highly correlated, these CRs should be excluded from the cooperative sensing group. In this paper we present a technique to successfully identify those CRs and how to quantify justification for their exclusion. ?? 2010 IEEE.

Index Keywords: Channel conditions; Cognitive radio; Cooperative sensing; Cooperative spectrum sensing; Energy detection; Highly-correlated; Log-normal shadowing; Radio channels; Received signals; Shadowing effects; Spatial diversity; Spatial diversity gain; Fading channels; Underwater acoustics; Fading (radio)

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