

## LIST OF FIGURES

Figure 1.1.	Spectrum hole in cognitive radio .....	1
Figure 2.1.	OFDM Diagram.....	5
Figure 2.2.	A conceptual illustration of spectrum holes over time and frequency.....	7
Figure 2.3.	The hidden terminal problem occurs when a CR user experiences shadowing or lies outside coverage area of the transmitter of a primary user (licensed user) .....	8
Figure 2.4.	Hypothesis test and possible outcomes with their corresponding probabilities...	9
Figure 2.5.	Primary transmitter detection.....	10
Figure 2.6.	Transmitter detection problem: (a) receiver uncertainty and (b) shadowing uncertainty .....	13
Figure 2.7.	Cooperative transmitter detection under highly faded and shadowed environment .....	13
Figure 2.8.	Cooperative transmitter detection using fusion center.....	14
Figure 2.9.	Collaborative spectrum sensing .....	14
Figure 2.10.	Primary receiver detection .....	15
Figure 2.11.	Interference temperature management.....	16
Figure 2.12.	An OFDM Block. A CP of $T_c$ symbols is copied in front of the data Block .....	16
Figure 2.13.	Parallel topology with fusion center used for distributed signal processing.....	19
Figure 2.14.	Data distribution at each sensor under hypotheses $H_1$ and $H_0$ , and confidence regions. Threshold is indicated by $T$ . The intervals $(-\infty, T_L)$ and $(T_U, \infty)$ are designated “confidence” regions. Interval $(T_L, T_U)$ is designated “no confidence” region.....	20
Figure 2.15.	Data distribution at each sensor under hypotheses $H_1$ and $H_0$ , and confidence regions.....	21
Figure 3.1.	System configuration of distributed detection .....	24
Figure 3.2.	Data distribution at each sensor under hypotheses $H_1$ and $H_0$ and confidence regions.....	25
Figure 3.3.	The Process Flow of Detection System Model.....	30
Figure 4.1.	Distribution data of detection result by single local detector at SNR= -10dB.....	31
Figure 4.2.	Distribution data of detection result by single local detector at SNR= 0 dB .....	32
Figure 4.3.	ROC graphic of detection result by single local detector at SNR= -10dB .....	32
Figure 4.4.	ROC graphic of detection result by single local detector at SNR= 0 dB .....	33
Figure 4.5.	ROC graphic of detection result by single detector with various SNR .....	33
Figure 4.6.	Probability of detection by single local detector with various SNR .....	34
Figure 4.7.	ROC of global decision with 32 local detectors .....	34
Figure 4.8.	ROC of global decision with various number of local detectors at SNR=-10dB .....	35
Figure 4.9.	ROC of global decision with various SNR .....	35
Figure 4.10.	Probability of detection of global decision with various number of local detectors at SNR= -10dB .....	36
Figure 4.11.	Probability of detection of global decision with various number of local detectors and SNR .....	36
Figure 4.12.	ROC of global decision using SDC and HDC at SNR = -10dB .....	37
Figure 4.13.	Probability of detection of global decision with various SNR using HDC and SDC.....	37
Figure 4.14.	ROC of global decision using SDC, HDC, and HDC 2-bit at SNR = -10dB .....	38
Figure 4.15.	Probability of detection of global decision with various SNR using SDC, HDC, and HDC 2-bit .....	39
Figure 4.16.	Probability of detection of global decision with various number of local detectors using SDC, HDC 1-bit, and HDC 2-bit.....	40