



信号循环谱在衰落与多普勒信道中的特性

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Cyclic Feature of Signals in Fading Doppler Channels

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摘要

基于信号循环谱特征的频谱感知方法是认知无线电系统频谱感知的关键技术之一, 信号的循环谱特征是研究该感知方法的基础. 基于调制信号的循环谱理论, 研究多径衰落和多普勒频移条件下无线调制信号的循环谱特征, 并进行仿真验证. 分析和仿真表明, 多径衰落使信号循环谱的幅度和相位发生了改变, 但没有影响信号的循环频率. 而多普勒频移不但展宽了信号的频谱, 同时造成信号的循环频率在某些地方发生了偏移, 在非循环频率处, 也出现了明显不为零的成分. 这对基于循环谱特征检测的认知无线电频谱感知与信号检测具有重要的参考价值.

关键词: [认知无线电](#); [频谱感知](#); [多径衰落](#); [多普勒频移](#)

Abstract:

Abstract: Spectrum sensing based on the cyclic feature detection is a key technique in cognitive radio. The cyclic-feature in the spectrum of signals is fundamental to the detection. Using the theory of cyclic spectrum of signals, this paper investigates cyclic-feature in the spectrum of a signal which suffers from fading and Doppler shift. Simulation results show that the cyclic spectrum of a fading and frequency shifted signal is quite different from that of the corresponding ideal signal. The amplitude and phase of the cyclic spectrum are changed significantly, but the frequency is the same as the ideal signal. Doppler shift broadens the signal spectrum and shifts the cycle frequency, and new spectral components occur at non cycle frequencies. This phenomenon is important in spectrum sensing and signal detection based on the cyclic feature detection.

Keywords: [cognitive radio](#); [spectrum sensing](#); [multipath fading](#); [Doppler shift](#)

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