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论文

# 数字超宽带信号的功率谱密度

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摘要
该文根据各种超宽带(UWB)信号的调制特点，给出了统一的随机脉冲信号模型，并应用随机理论计算得出相应的功率谱密度(PSD)函数表达式，此PSD表达式应用范围广，适用于各种调制方式、多址方式、进制下的UWB信号。该文举例分析比较了几种典型调制下带有均匀分布的随机时间抖动(timing jitter)及理想情况下的信号PSD，结果表明，时抖动的存在平滑了信号功率谱，降低了对其他窄带通信系统的干扰。而且，文中给出的PSD函数表达式可以用来估计信号各参量的变化对PSD函数的影响，而不需要考虑脉冲序列的详细设计过程。

关键词 功率谱密度(PSD) 超宽带(UWB) 自相关函数 时间抖动 谱分析

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## Power Spectral Density of Digital Ultra Wide-band Signals

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Abstract
In this paper, a unified model of the random impulse radio signals is presented based on the characters of a variety of UWB modulation signals. The Power Spectral Density (PSD)for the signals is carried out using stochastic theory. This PSD expression is used widely, such as for various modulation forms, various multi-access forms, either binary or M-ary systems. The PSD expressions for several typical modulation signals with or without the uniformly distributed timing jitter are taken for example and analyzed in details. The results show that the timing jitter smoothes the spectrum and alleviates the interferences on other narrowband communication systems. Furthermore, the results can be used to estimate the effect of changes in various parameters on PSD of transmitted signal, without going through the detailed design procedure.

Key words Power Spectral Density (PSD) Ultra Wide-Band (UWB) Auto correlation function Timing jitter Spectral analysis

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