

论文

跳时序列调制超宽带正交Hermite脉冲串雷达信号分析

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摘要

超宽带正交Hermite脉冲是一类非常适合表征超宽带(UWB)穿墙探测雷达工作波形的脉冲, 具有设计灵活、频谱利用率高、实现简单、波形存在解析表示方便理论分析等特点。该文从定义出发推导了跳时调制超宽带(TM-UWB)Hermite脉冲串波形的模糊函数解析表达式, 仿真分析了模糊特性与跳时序列的自相关特性、序列周期以及与Hermite脉冲平均重复时间间隔, 脉冲的阶数和时间尺度因子的关系, 并探讨了在穿墙探测环境下该波形作用的旁瓣抑制和杂波抑制等关键技术。

关键词 [UWB穿墙探测雷达](#) [TM-UWB脉冲串](#) [Hermite脉冲](#) [模糊函数](#)

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Analysis of Time-Hopping Sequences Modulated UWB Orthogonal Hermite Pulse-Sequence Radar Signal

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Abstract

An ultra-wideband orthogonal Hermite pulse is an appropriate family of pulses that can represent the commonly-used waveforms in through-the-wall surveillance radar. It has advantages of flexible design, high spectrum utilization and simple design. An analytical expression of the ambiguity function for a train of Time-hopping Modulated Ultra-WideBand (TM-UWB) Hermite waveforms is derived. The relation of resolution, side-lobe suppression characteristic and unambiguous for TM-UWB impulse waveforms with the autocorrelation properties, period of time-hopping sequences, and the average pulse repetition period, order number and scaling parameter of the Hermite signal are investigated, and some application issues for through-the-wall surveillance radar, such as sidelobe suppression and clutter suppression, are also discussed.

Key words [UWB through-the-wall surveillance radar](#) [TM-UWB pulses](#) [Hermite pulse](#) [Ambiguity function](#)

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