论文

基于Dechirping技术的宽带全数字阵列雷达时延测量方法研究

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摘要

该文基于Dechirping技术，提出了一种测量宽带数字阵列中不同T/R组件间相对时延的新方法。为了提高雷达系统的灵活性、可扩展性及减低硬件成本，该方法可全部通过软件实现，利用抽取技术和FFT算法，不仅能有效地降低数据率和提高计算效率，而且有较好的测量精度及实时性，并能在一次测量过程中对多个T/R组件间的相对时延进行同时测量。文中从理论角度分析了影响测量方法性能的各个因素及其特点，并在此基础上确定出测量系统的各项最佳参数。仿真实验结果验证了该方法的有效性。

关键词　　宽带数字阵列雷达　Dechirping　宽带LFM脉冲信号　相对时延测量

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A Method of Relative Delay Measurement for the Wideband Digital Array Radar Based on Dechirping Technique

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Abstract

In this paper, based on the Dechirping technique, a new method of measuring relative delays among digital T/R modules for the wideband digital array utilizing wideband LFM pulses is proposed. To enhance radar system's flexibility and extensibility and reduce hardware costs, this method can be realized by software. By using the decimation and FFT algorithm, not only can the measurement method be easier to be implemented for computational efficiency and reduce data rate, but also good measurement precision and real-time performance are achieved, at the same time, all relative delays among multiple digital T/R modules are enabled to be acquired in one measurement process. The performance of the proposed method is analyzed from the theoretical angle and thus some optimal system parameters are determined. The simulation results show the effectiveness and efficiency of the proposed method.

Key words　Wideband digital array radar　Dechirping　Wideband LFM pulse signal　Relative delays measurement

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