

提高毫米波近程探测雷达距离跟踪精度新算法

黄骏 何培宇 高勇 李任科*

四川大学电子信息学院 成都 610064

A Novel Algorithm for Improving Range-tracking Accuracy of Short-range Millimeter Wave Radar

Huang Jun He Pei-yu Gao Yong Li Ren-ke*

School of Electronics and Information Engineering, Sichuan University, Chengdu 610064, China

摘要

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摘要 该文针对毫米波近程探测雷达在短时间信号积累条件下对空间弱目标进行距离跟踪时,存在的测距精度低与抗干扰能力差的问题,提出了一种多重自相关重构算法。该算法通过将差拍数据进行不同方式排列后获取的自相关信息进行多重融合,之后再对重构出的自相关序列进行距离谱分析,进而获取距离信息。这样可在抑制干扰的同时,实现目标距离跟踪分辨率的二次指数次方倍数的增加,并且它可在传统算法无法工作的低信噪比条件下,实现高精度测距。仿真实验验证了理论分析的结果和算法的有效性。

关键词: 毫米波近程探测雷达 多重自相关重构 距离跟踪

Abstract: A novel algorithm using multilayer reconstructed-autocorrelation is proposed for range tracking with short time signal in powerful noise on a short-range millimeter wave radar. This algorithm can solve the problem of weak anti-jamming ability and low accuracy in range tracking brought by above conditions, which reconstructs a data sequence by rearrangement autocorrelation of the observed data vector and then range information can be got by doing spectrum analysis. By using of this algorithm, straining noise and analyzing the spectrum are organically combined. Not only are the estimate precision is increased by exponential but also the frequency stability is greatly improved. The simulation results test and verify the theoretical analysis result and the algorithm effectiveness.

Keywords: Short-range millimeter wave radar Multilayer reconstructed-autocorrelation Range tracking

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通讯作者: 黄骏 Email: hj065115@163.com

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