

论文

基于外辐射源的ESPRIT超分辨成像算法

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摘要

在基于外辐射源的无源雷达成像算法中, 获得方位向的高分辨率需要大的目标累积转角, 然而在实际系统中, 一方面大转角需要时间长, 难以满足实时要求; 另一方面, 目标散射函数在不同的姿态角下并不一样, 当转角增大时, 其变化的程度会更严重。该文针对小转角情况下如何获得较好的成像效果提出了ESPRIT超分辨成像算法。该方法通过估计回波信号的自相关矩阵, 利用特征值分解得到各散射点对应的正弦波频率, 根据正弦波频率推导目标点的位置, 从而估计散射点散射强度。实验证明了该算法的可行性。

关键词 [无源雷达成像](#) [外辐射源](#) [超分辨](#) [旋转不变技术](#)

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ESPRIT Super-Resolution Imaging Algorithm Based on External Illuminators

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Abstract

Passive radar imaging algorithm based on external illuminator requires large accumulated rotating angle of target. But in an actual circumstance, large rotating angle demands long time, which is hard to satisfy the request of real time, on the other hand, target reflectivity function differs at various aspect angles. Moreover, when rotating angle increases, target reflectivity function differs seriously. In this paper, an ESPRIT based high resolution passive radar imaging algorithm is proposed to solve the problem which is that how to form a good image at the instant of small rotating angle. In the method self-correlation matrix of the returned echoes is estimated firstly, then corresponding sine wave frequencies of the scattering-centers with the object is determined through eigenvalue decomposition, target location is deduced with the sine wave frequency, hence the reflectivity of the scattering-centers are computed. Computer simulation confirms the feasibility of the algorithm.

Key words [Passive radar imaging](#) [External illuminator](#) [Super-resolution](#) [Rotational invariance techniques](#)

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