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算法研究

强干扰背景下二维弱信号DOA估计的修正投影阻塞法

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摘要：

针对强干扰背景下的二维微弱信号波达方向(Direction of Arrival, DOA)估计问题,提出了一种基于修正投影阻塞的算法。该算法通过构造干扰子空间的正交投影矩阵作为干扰阻塞矩阵，对接收阵列信号做预处理，从而达到抑制干扰的目的。本文对提出的修正投影阻塞法进行了理论分析，并在常见二维阵型(如面阵、十字阵、Y阵)上进行仿真和性能对比，仿真结果表明：该方法无需已知干扰角度，在多个干扰条件下能有效估计弱信号的波达方向，且不损失自由度。

关键词： 强干扰/微弱信号；波达方向估计；修正投影阻塞

Two-Dimensional Weak Signal DOA Estimation Based on Corrected Projection Jam Method in the Presence of Strong Interference

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Abstract:

For weak signals direction-of-arrival （DOA）estimation of two-dimensional in the presence of strong interference，a new algorithm based on the corrected projection jam method is presented. This paper constructs the orthogonal projection matrix of jamming subspace as block matrix and then pre-processes the received array signal vector，so as to constrain the strong interferences. In this paper, the corrected projection jam method is theoretically analyzed. simulation and performance comparison are carried out for the common two-dimensional array （such as plane array, cross array and Y array）. The simulation results show that this method can effectively estimate DOA of weak signals in condition of multiple strong signals present, which is unaffected by the given angle information of strong interference without losing degrees of freedom.

Keywords: strong interference/weak signal；direction-of-arrival estimation；corrected projection jam

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