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一种基于导向矢量变换的DOA估计预处理方法

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A DOA Estimation Pre-processing Method Based on Steering Vector Transformation

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摘要 针对大多数空间谱估计算法在目标数量大于阵列自由度时失效这一问题，该文基于内插阵列变换思想，提出一种基于导向矢量变换的空域滤波方法。利用目标分布的先验信息，将观测空间划分为若干子空间，保证每一子空间内的目标数量小于阵列自由度；使用内插阵列变换方法，将整个观测空间的导向矢量变换为子空间的导向矢量，抑制子空间外的目标，从而将观测空间内大量目标的DOA估计问题转化为若干子空间内的常规DOA估计问题。计算机仿真结果验证了方法的有效性。

关键词： 阵列信号处理 空域滤波 虚拟阵列变换 DOA估计

Abstract： Most of the spatial spectrum estimation algorithms fail when the number of targets is lager than the array freedom. To deal with this problem, a spatial filtering method, which is based on steering vector transformation by using the method of interpolated array, is proposed in this paper. The entire observation space is divided into several sub-spaces, and the number of targets in each sub-space is guaranteed smaller than the array freedom by the priori information. By array interpolating, the steering vector of the entire observation is transformed into sub-space steering vector, which means the targets outside the subspace are inhibited. As the result, the mass targets DOA estimation issue in the entire observation space is transformed into a conventional DOA estimation issue in several sub-spaces. Simulative results show the effectiveness of the method presented.

Keywords： Array signal processing Spatial filtering Virtual array transformation DOA estimation

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