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论文

存在阵列模型误差情况下的宽带DOA估计

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Approach for Wideband Direction of Arrival Estimation in the Presence of Array Model Errors

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摘要 针对工程应用中存在阵列模型误差的任意形状天线阵列的宽带波达方向（DOA）估计问题，提出一种基于信号分离的相关域宽带松弛（RELAX）算法。此算法利用具有记忆与遗忘特征的矩阵算子的投影机理对入射信号进行有效的分离，因此对一定范围内的阵列模型误差较之基于子空间理论的传统宽带测向算法具有较好的鲁棒性与良好的工程应用前景。分析并证明了此算法的信号分离机理及此算法对阵列模型误差稳健的原理。理论分析与仿真结果均表明存在阵列模型误差时此算法宽带DOA估计的有效性和稳健性。

关键词： 阵列模型误差 DOA 宽带 稳健性 信号分离

Abstract： A correlation domain wideband algorithm RELAX based on signals separation category is proposed. This algorithm can estimate the direction of arrival (DOA) of wideband sources in the presence of arbitrary antenna array model errors. By using the matrix operators with memory and oblivion characteristics, this algorithm can separate incident signals effectively. Compared with the traditional wideband DOA estimation algorithms which are based on the subspace theory, this algorithm can relax the requirement of the array model's precision within certain limits. So it has a good prospect in engineering application. This article analyzed and proved the mechanism of signals separation and the robustness of this algorithm in relation to array model errors. The validity and robustness of this algorithm, in the presence of array model errors, are confirmed by theoretical analysis and simulation results.

Keywords： array model errors DOA wideband robustness signals separation

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