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基于失配误差正交分解的稳健自适应波束形成

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Robust Adaptive Beamforming Based on Mismatch Errors Orthogonal Decomposition

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摘要 针对自适应波束形成中期望信号导向矢量的失配问题，该文提出了一种利用失配误差的正交分量来逐步修正期望信号导向矢量的自适应波束形成方法。该方法首先构造两个正交子空间，正交分解失配误差以后，通过引入松弛变量，把修正过程转化为解决迭代的二次凸优化问题。提出的方法没有假定失配误差模约束或概率约束，从而避免了上限估计和概率分布建模。仿真结果验证了方法的有效性。

关键词：　自适应波束形成　正交分解　凸二次规划　松弛变量

Abstract：　A novel algorithm for robust adaptive beamforming is presented in this paper to solve the problem of the mismatch errors between the actual and presumed steering vectors. By using the orthogonal component of the errors, the method can obtain the desired steering vectors successfully. Two orthogonal subspaces are constructed firstly, and then the mismatch errors are orthogonally decomposed, so the correcting process of steering vectors is transformed into an iterative quadratic convex optimization issue by using a slack variable. The proposed algorithm does not need the conditions of the norm or probability constraint of the mismatch errors. Therefore, it avoids estimating upper bound values and probability distribution modeling. Simulation results show the effectiveness of the proposed algorithm.

Keywords：　Adaptive beamforming　Orthogonal decomposition　Convex quadratic programming　Slack variable

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