

## 基于噪声子空间奇异值的信号分量数目估计

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## Estimation of the Number of Signal Components Based on Singular Values of Noise Subspace

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摘要

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**摘要** 针对现有信号分量数目估计方法在低信噪比时估计性能差的问题, 该文提出了基于噪声子空间奇异值恒虚警检测方法估计信号分量数目。通过对Hankel矩阵奇异值与噪声能量之间关系的研究, 利用高斯白噪声包络平方服从指数分布的特点, 在虚警率一定的条件下, 获得噪声子空间奇异值检测门限。仿真结果显示该方法在低信噪比时有效。

**关键词:** 信号处理 子空间 奇异值分解 恒虚警检测 信号分量 参数估计

**Abstract:** A new method is proposed to improve the performance of estimating the number of signal components in low Signal-to-Noise Ratio (SNR) environment, based on singular values of noise subspace and the principle of Constant False Alarm Rate (CFAR). Through researching the relationship between singular values of Hankel matrix and the energy of noise, the threshold of detecting singular values of noise subspace is got in a certain probability of false alarm by using the characteristic of Gaussian white noise envelope submitting to exponential distribution. Simulation results show that the method is effective in low SNR condition.

**Keywords:** Signal processing Subspace Singular value decompose Constant False Alarm Rate (CFAR) detection Signal component Parameter estimation

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