

应用

非均匀非高斯杂波的协方差矩阵估计

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摘要:

在雷达目标检测中, 杂波的协方差矩阵估计利用了待检测单元附近的杂波数据。本文考虑一种非均匀环境中, 非高斯杂波下的杂波协方差矩阵估计问题, 即假定待检测单元与参考单元的杂波协方差矩阵之间满足某种统计关系, 并假定杂波数据满足复合高斯统计分布模型。在这种场景下, 常规的杂波协方差矩阵估计方法会导致信号检测性能的下... (text continues)

关键词: 自适应检测; 复合高斯; 非均匀场景; 贝叶斯方法; 协方差矩阵

Covariance Matrix Estimation of the nonhomogeneous and non-Gaussian Clutter

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Abstract:

For the problem of the radar targets detection, the clutter data around the cell under test is used for the estimation of the clutter covariance matrix. In this paper, we consider the covariance matrix estimation of compound Gaussian clutter of nonhomogeneous environments, i.e., the training samples used for adaptation do not share the same covariance matrix as the vector under test, and the clutter can be modeled in terms of a compound Gaussian process. The conventional covariance matrix estimations have poor performance under this environment. In this paper, the conjugate prior distributions of unknown parameters of clutter statistics are used to describe the nonhomogeneous environments, and based on Bayesian framework, the minimum mean square error estimation of clutter covariance matrix is proposed, using Gibbs sampler. The computer simulation is used to validate the method proposed in this paper, and the results show that the method of the covariance matrix estimation proposed in this paper is better than conventional ones, especially within a small number of training samples and coherent pulses. The impact of the error of parameters of prior distributions on the detection performance is also analyzed in the end of the paper.

Keywords: adaptive detection compound Gaussian nonhomogeneous environments Bayesian framework covariance matrix

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