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复合高斯杂波中距离扩展目标的迭代近似GLRT检测器

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Recursive Asymptotic GLRT Detector of Range-spread Target in Compound Gaussian Clutter

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摘要

研究了结构化的复合高斯杂波(CGC)背景中距离扩展目标自适应检测问题。针对异质杂波背景中的近似广义似然比检验(AGLRT-HTG)检测器应用于CGC背景中时存在一定的信杂比损失问题,结构化的复合高斯杂波采用自回归过程建模,结合近似广义似然比检验(AGLRT)方法和迭代估计思想,提出了CGC背景中距离扩展目标的迭代近似广义似然比检测器(RAGLRT-CGC)。从理论上分析了极限情况下RAGLRT-CGC虚警概率与检测门限关系的解析表达式。仿真结果表明,在CGC背景中,RAGLRT-CGC对不同多主散射点目标具有较好的鲁棒性,并且检测性能明显优于AGLRT-HTG。

关键词： 雷达杂波 复合高斯杂波 距离扩展目标 检测 自回归 广义似然比检验

Abstract:

This paper addresses the adaptive detection of range-spread targets in a structured compound-Gaussian clutter (CGC). In view of the fact that the asymptotic generalized likelihood ratio test in a heterogeneous environment (AGLRT-HTG) suffers a signal to clutter ratio loss in a CGC environment, the structured CGC is modeled as an autoregressive process and a recursive AGLRT in the compound-Gaussian clutter (RAGLRT-CGC) environment is proposed by using the method of asymptotic generalized likelihood ratio test (AGLRT) and the idea of recursive estimation. The analytical formula relating false alarm probability to detection threshold for limit cases is deduced. The simulation results show that the RAGLRT-CGC is robust to different multiple dominant scattered targets and the detection performance of RAGLRT-CGC is obviously better than the AGLRT-HTG.

Keywords: radar clutter compound-Gaussian clutter range-spread target target detection autoregressive generalized likelihood ratio test

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