

### 一种新的极化SAR图像目标CFAR检测方法

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## A New Polarimetric SAR Image CFAR Target Detecting Method

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摘要

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**摘要** 该文提出了一种新的极化SAR图像目标CFAR检测算法。首先,在乘积模型框架下,引入具有均匀度变化下广泛杂波区域建模能力的逆Gamma分布,推导出了极化匹配滤波(PMF)检测量的分布模型 $P-G^0$ 分布。进而,利用基于Mellin变换的对数累积量导出了 $P-G^0$ 分布的参数估计器,保证了PMF检测量的精确建模。最后,推导出 $P-G^0$ 分布的CFAR检测阈值求解公式,以此设计了新的CFAR检测算法。利用RADARSAT-2极化SAR数据的实验结果表明了 $P-G^0$ 分布对不同均匀度的地物都具有良好的拟合性能,所提检测算法能够实现均匀度变化较大环境下目标的准确、自动检测。

**关键词:** SAR CFAR检测 极化匹配滤波 逆Gamma分布  $P-G^0$ 分布

**Abstract:** A new polarimetric SAR image CFAR target detection method is proposed in this paper. Firstly, the statistical distribution of PMF (Polarimetric Matched Filter) metric is deduced (signified as  $P-G^0$  distribution) based on product model combining the inverse Gamma distribution which is effective in modeling of clutter with diverse homogeneity. Farther, the parameter estimator of such distribution is educed using logarithm cumulants grounded on Mellin transform, which assures the exact modeling of PMF metric. Finally, the formula of CFAR detection threshold is deduced and a new CFAR detection method is designed. The experimental results using RADARSAT-2 polarimetric SAR data demonstrate  $P-G^0$  distribution is efficiency in data fitting of terrains and the proposed detection method can implement the accurate and automatic target detection in clutter with diverse homogeneity.

**Keywords:** SAR CFAR detection Polarimetric Matched Filter (PMF) Inverse Gamma distribution  $P-G^0$  distribution

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