

一种加权最小熵的ISAR自聚焦算法

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Weighted Minimum Entropy Autofocus Algorithm for ISAR Imaging

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摘要

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摘要 基于加权最小二乘估计(WLS)的最小方差准则, 根据各个距离单元的相位方差的差异, 该文提出了一种加权最小熵的ISAR自聚焦算法, 利用加权熵建立代价函数, 通过迭代算法估计误差相位以实现运动误差补偿。该算法具有较高的鲁棒性, 相对于传统最小熵ISAR自聚焦算法, 能够有效提高迭代的收敛速度, 并且权值系数的应用可以有效降低杂波和噪声的影响, 从而取得更好的聚焦效果。基于仿真数据和实测数据的实验验证了该算法的有效性。

关键词: 逆合成孔径雷达(ISAR) 加权最小二乘 加权最小熵自聚焦 收敛速度 杂波和噪声抑制

Abstract: A novel method of Weighted Minimum Entropy Autofocus (WMEA) algorithm for ISAR imaging is proposed where the objective function of weighed entropy is constructed and then solved with iterative technique to seek for phase errors. Based on Weighted Least-Squares (WLS) principle, the algorithm proposed is very robust by exploiting the difference of phase error variations in range cells. Contrary to traditional Minimum Entropy Autofocus (MEA) algorithm, the convergence rate could be greatly promoted by weighted minimum entropy autofocus algorithm. Besides, with this method clutter and noise could be suppressed efficiently to achieve better performance. The experimental results using both simulated data and measured data confirm the validation of the proposed algorithm.

Keywords: Inverse Synthetic Aperture Radar (ISAR) Weighted Least-Squares (WLS) Weighted Minimum Entropy Autofocus (WMEA) Convergence rate Clutter and noise suppressed

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