

非合作雷达目标散射中心关联和三维重建算法

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Method of Scattering Centers Association and 3D Reconstruction for Non-cooperative Radar Target

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摘要

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摘要 针对非合作雷达目标3维重建技术中各未知视角下1维散射中心难以关联的问题, 该文提出了一种基于几何约束的散射中心关联方法。此方法通过对反投影误差的检验实现了对部分可靠散射中心的自动选择和有效关联。同时, 利用由已关联散射中心距离数据估计出的目标运动参数, 实现目标上更多散射中心的关联和3维重建。仿真实验证明, 该文提出的算法能够适用于1维散射中心存在缺失点、虚假点和重叠点的复杂情况, 有效增强了未知运动目标散射中心关联和重建的鲁棒性。

关键词: 雷达3维成像 3维散射中心 散射中心关联 非合作目标

Abstract: For the problem of associating the 1D scattering centers at unknown viewing angles existed in the technique of non-cooperative radar target 3D reconstruction, a method of scattering centers association based on geometric constraint is proposed. In the method, a part of reliable scattering centers are automatically selected and effectively associated via checking the back-projection error. Meanwhile, with the motion parameters estimated from the range data of the associated scattering centers, more scattering centers on the target can be associated and reconstructed. The simulations verify that, the proposed algorithm is applicable to the complex situations where missing, fault and overlapping points existed in the 1D scattering centers, and the robustness of the scattering centers association and reconstruction for unknown moving target can be effectively enhanced.

Keywords: Radar 3D imaging 3D scattering centers Scattering centers association Non-cooperative radar target

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