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综述

干涉式逆合成孔径雷达成像技术综述

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摘要：

干涉式逆合成孔径雷达（InISAR）成像是一种将干涉技术与逆合成孔径分辨相结合的高分辨雷达三维成像方法，能够实现对远距离运动目标全天候、全天时的三维成像，在军事和民用领域都呈现出广泛的应用前景和实用价值。其基本思想是利用位置分布不同的多个天线获取成一定视角差的多幅逆合成孔径雷达（ISAR）复图像，实现目标散射中心的二维分辨，然后通过干涉相位处理，恢复出目标散射中心的真实三维分布。本文综述了InISAR三维成像的理论框架，回顾了InISAR成像技术的发展历程，着重对图像配准、相位解缠绕、运动补偿、斜视、基线配置等关键技术难点进行了分析和评估，明确了研究中存在的问题，阐述了有待进一步研究的方向，最后对InISAR的发展现状和趋势进行了总结和展望。

关键词： 三维成像； 干涉式逆合成孔径雷达； 图像配准； 相位解缠绕； 斜视

Review of Interferometric ISAR Imaging

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Abstract:

Interferometric inverse synthetic aperture radar (InISAR) imaging is a recently developed radar three-dimensional (3-D) imaging method, which combines the interferometric technique and the inverse synthetic aperture radar (ISAR) processing. InISAR is able to carry out 3-D imaging of a far field moving target under all-weather condition and any required time, so it has shown a wide range of prospects and practical value in the field of military and civilian applications. The interferometric ISAR imaging requires a radar system with at least two receiving antennas spatial-separately employed to observe the target from different aspects. The echoes from the target are received by the two receivers and are processed respectively to obtain two-dimensional (2-D) images via the conventional ISAR processing. The azimuth or height information is then obtained from the phase differences of corresponding pixels in different ISAR images. This paper begins with an investigation of the InISAR imaging principle, followed by the development history and current status of InISAR imaging. The primary technique problems such as image registration, phase unwrapping, motion compensation, squint effect, baseline scheme and so on are particularly addressed. Moreover, the existing problems that need further research are pointed out. In the end, some current challenges and future trends are summed up and predicted.

Keywords: squint effect

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