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算法研究

旋转目标在三孔径InSAR中的幅相特性

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摘要:

该文首先建立了旋转目标的时频模型、多普勒模型;然后利用旋转目标的多普勒特点分析其SAR成像特点;最后分析了三孔径InSAR中偏置相位中心天线(DPCA: Displaced Phase Centre Antenna)杂波对消以及沿迹干涉(ATI: Along-Track Interferometry)的物理意义,得到了三孔径干涉对消处理后旋转目标的幅度、相位特性。这种分析方法比以往斜距近似分析更简单直观,并且仿真实验验证了结论的正确性,并且分析了其相位缠绕可能造成的动目标检测误差。为研究微运动目标在多通道SAR中的成像特性研究提供了初步的参考,证明了微动类型干扰对SAR动目标检测也能够形成不利影响。

关键词: 合成孔径雷达; 偏置相位中心天线; 沿迹干涉; 微运动; 旋转目标

The Amplitude and Phase Characteristics of Rotating Target's in The Three Apertures InSAR

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Abstract:

In this paper, the time-frequency and Doppler models of a rotating target are established firstly, and then its SAR image characteristic can be derived from the Doppler-domain. Finally the perspectives of physical significance of Displaced Phase Centre Antenna and Along-Track Interferometry technologies which are used in the three apertures InSAR to achieve clutter cancellation and velocity estimation are analyzed. By combining those conclusions come from the former steps, the amplitude and the interferometric phase characteristics of the rotating target's in the three apertures InSAR are easily derived separately. It shows that this method is more intuitive and simple than traditional method by establishing approximate slant-range model of rotation target. Those conclusions are verified by some simulations. It also presents that an error GMTI result may occur resulting from phase wrapping when InSAR probes rotating targets. This paper will be a pilot study on micro-motion targets under the circumstances of multi-channel SAR, and proves that the micro-motion type jamming can adverse effect GMTI.

Keywords: SAR DPCA ATI micro motion; rotating target

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