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星/机双基SAR成像技术研究

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A Study of Spaceborne/Airborne Hybrid Bistatic SAR Imaging

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摘要 该文首先对星/机双基SAR实用化的工作模式进行了系统而全面的分析，包括成像几何、回波方程、场景宽度、多普勒带宽、分辨率等等；针对传统方法在求解双基点目标参考谱(BPTRS)时需要泰勒级数近似展开的问题，该文提出了一种新的精确BPTRS求解方法，该方法从时频一一对应关系出发，摒弃了泰勒级数近似展开的做法，推导结果不需要条件约束，最后通点目标仿真实验，验证了该文BPTRS的正确性。

关键词： 星/机双基合成孔径雷达 成像模式 多普勒历程 分辨率 双基点目标参考谱

Abstract： A comprehensive and systematic study of the operational imaging modes for the Spaceborne/Airborne hybrid Bistatic SAR (SA-BiSAR) is made firstly, including imaging geometry, echo equation, scene width, Doppler history, and resolutions and so on. To overcome the shortcomings of the Taylor series expansion in deriving the Bistatic Point Target Reference Spectrum (BPTRS) in conventional BPTRS-resolving methods, an exact analytical BPTRS, which is derived from the one-to-one correspondence between time and azimuth frequency with no Taylor series expansions, is proposed, and the derived result is free of constraints. Finally, the validity of the proposed solution is verified by point targets simulations.

Keywords： Spaceborne/Airborne hybrid Bistatic SAR (SA-BiSAR) Imaging mode Doppler history Resolution Bistatic Point Target Reference Spectrum (BPTRS)

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