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航天电子技术

基于通用复时频分布的进动目标微多普勒提取

寇鹏1,2， 刘永祥1， 李康乐1， 霍凯1

1. 国防科学技术大学电子科学与工程学院， 湖南 长沙 410073;
2. 西安卫星测控中心， 陕西 西安 710043

摘要：

首先建立了进动锥体目标的雷达回波模型，推导了目标微多普勒频率与进动参数的定量关系。针对进动目标雷达回波具有的多分量非线性调频特点，提出了通用复时频分布(generalized complex time frequency distribution, GCD)的微多普勒提取方法，与线性和二次Cohen类时频分布相比，GCD具备高时频分辨力、低交叉项的优点。同时针对峰值估计微多普勒瞬时频率(instantaeous frequency, IF)方法受信号频率交叉覆盖和噪声干扰严重的问题，提出基于Viterbi算法的微多普勒IF估计方法，有效提高了微多普勒IF估计精度。实验中利用仿真和暗室测量数据验证了GCD Viterbi方法的性能。

关键词： 微多普勒 进动 复时频分布 瞬时频率

Micro Doppler extraction of precession targets based on generalized complex time frequency distribution

KOU Peng1,2, LIU Yong-xiang1, LI Kang-le1, HUO Kai1

1. School of Electronic Science and Engineering, National University of Defense Technology, Changsha 410073, China；
2. Xi'an Satellite Control Center, Xi'an 710043, China

Abstract:

The radar signal model of cone targets with precession is provided, which can develop the relationship between micro Doppler and precession parameters. Due to the characteristics of nonlinear frequency modulated and multi components in radar signal, generalized complex time frequency distribution (GCD) is introduced to analyze the micro Doppler of targets with precession, which has better concentration and time frequency resolution compared with that of classical time frequency distributions. Moreover, the estimation algorithm of micro Doppler instantaneous freqThe radar signal model of cone targets with precession is provided, which can develop the relationship between micro Doppler and precession parameters. Due to the characteristics of nonlinear frequency modulated and multi components in radar signal, generalized complex time frequency distribution(GCD) is introduced to analyze the micro Doppler of targets with precession, which has better concentration and time frequency resolution compared with that of classical time frequency distributions. Moreover, the estimation algorithm of micro Doppler instantaneous frequency based on GCD and Viterbi method is proposed to reduce the effect of cross term artifacts and noise, as well as improve the estimating precision. The performance of the estimation algorithm is validated with simulated data and radar data.uency based on GCD and Viterbi method is proposed to reduce the effect of cross term artifacts and noise, as well as improve the estimating precision. The performance of the estimation algorithm is validated with simulated data and radar data.

Keywords: micro Doppler precession generalized complex time frequency distribution instantaneous frequency

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作者简介:

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