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基于TOA测量的T^n-R型无源雷达目标跟踪算法

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摘要：

针对传统单次无源定位方法对发射站与接收站的布站要求高的缺点，提出了基于到达时间（time of arrival, TOA）测量的T^n-R型外辐射源雷达目标跟踪算法。该算法基于多个发射站获得的目标TOA测量值，采用Levenberg-Marquardt算法快速给出目标位置，然后利用扩展卡尔曼算法（extended Kalman filter, EKF）做滤波跟踪，解决了基本EKF算法的收敛速度慢和受初值影响大、易发散的问题。针对机动目标跟踪，提出了目标机动性判决方法并给出了一种简化的机动目标跟踪方案。针对外场试验数据的实际情况，采用了基于“两发一收”体制的目标跟踪和消除航迹模糊的方法。仿真与外场数据处理均表明，该算法收敛速度快，性能稳定，定位跟踪精度高，可满足实用要求。

关键词： 无源跟踪 扩展卡尔曼算法 位置初始算法 到达时间 航迹模糊

Target tracking algorithm in T^n-R passive radar using TOA measurement

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Abstract:

A target tracking method based on the time of arrival (TOA) measurement is proposed. This method not only overcomes the disadvantage of special sites deploying requirement in the location algorithm based on single-time TOA measurement but also greatly improves the location precision. Based on the TOA measurements of multi-stations, an extended Kalman filter (EKF) is used to track targets. To quicken the EKF converging speed, the Levenberg-Marquardt algorithm is utilized to give a more accurate initial value. Then a method to judge targets’ manoeuvre and a simplified tracking scheme are offered. Considering the nonideal property of the outfield condition, a system with only two emitters and one receiver is introduced and a method to eliminate the fuzzy track is presented. Simulation and real data processing results prove that the proposed method has the advantages of fast converging speed, stable performance and high precision.

Keywords: passive tracking extended Kalman filter initializing algorithm time of arrival fuzzy track

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1. 熊海良 1， 汪俊 1， 田红心 1， 杨宏 1,2 ， 易克初.基于阵列天线的UWB定位方案研究[J]. 系统工程与电子技术, 2010,32(2): 239-243