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应用

弹道导弹助推段同时跟踪和类型识别算法研究

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摘要：

前置地基雷达跟踪助推段弹道导弹对整个反导防御系统有着重要意义。本文提出了一种基于以情报数据库为先验知识的弹道导弹助推段及后助推段跟踪方法。首先从动力学角度提取导弹助推段飞行的特征参量，并对参量的敏感度进行了分析，给出了一种参变的助推段弹道导弹时不变运动模型。然后结合交互式多模型（IMM）和迭代无敏滤波(IUF)算法进行助推段及后助推段弹道导弹跟踪仿真。与采用其它的运动模型和滤波算法的仿真结果相比，该方法能实现对弹道导弹助推段更高精度的跟踪，同时通过计算模型转移概率结合情报数据库可完成导弹类型识别，并准确指示导弹关机时刻。文章通过仿真验证了该算法的有效性。

关键词： 弹道导弹；助推段跟踪；类型识别；交互式多模型；迭代无敏滤波；关机时刻

Study on Method for Simultaneously Tracking and Classifying Ballistic Missile in Boost and Post-boost Phase

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Abstract:

It is meaningful to tracking ballistic missile in boost phase precisely by forward ground-based radar for the whole anti-missile defensive system. The paper presents a new method to track ballistic missile in boost and post-boost phase based on prior database. At first, the paper extracts characteristic dynamic parameters of ballistic missile, and analyzes the sensitivities of these parameters and gives a time invariant dynamic model with parameters; then the paper simulates the performance for tracking ballistic missile in boost and post-boost phase with IMM and IUF algorithm. Compared with other dynamic models and algorithms, this new method has much higher tracking precision and by calculating the model transition probabilities, it can classify the ballistic missiles and indicates the burnout time accurately. The simulation results validate the new method.

Keywords: Ballistic Missile Boost Phase Tracking Classification Interactive Multiple Model Iterated Unscented Filter Burnout Time

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