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一种二维耦合模型机动目标跟踪算法

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Two-Dimensional Model for Maneuvering Target Tracking

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摘要

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摘要 针对雷达跟踪固定翼飞机的单目标跟踪问题,提出了一种新的二维耦合运动模型。该方法把切向加速度和法向加速度作为状态变量,给出了切向加速度和法向加速度为常值时解析计算状态转移的方法。该模型可以较好地一步预测目标加速度的变化,而且法向和切向加速度的过程噪声可以分别设置。利用该耦合模型的滤波方法,显著地改善了滤波效果,尤其是对加速度的估计。

关键词: 机动目标跟踪 卡尔曼滤波 二维水平运动模型 耦合模型 状态估计

Abstract: A new two-dimensional target maneuver model is presented. Tangential and normal accelerations are in the state vector. An analytical solution is presented to compute the state transfer function when both normal and tangential acceleration are constant. This model can give a better priori acceleration estimation. Tangential and normal accelerations are driven by white noise respectively in the model, and have different noise levels. The new filter algorithm provides a better performance, especially in the acceleration estimation.

Keywords: maneuvering target tracking Kalman filter two-dimensional horizontal motion model coupled model state estimation

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