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基于交互式多模型粒子滤波的状态估计方法(PDF)

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Title: A State Estimation Method Based on Interactive Multiple Model Particle Filter

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关键词: 状态估计; 粒子滤波; IMM

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摘要: 为了提高目标跟踪中状态估计环节的性能, 基于交互式多模型粒子滤波的状态估计方法,采用交互式多模型(IMM)描述目标的运动过程, 利用粒子滤波算法进行目标状态估计。方法避免了单一运动模型所带来的估计误差, 同时克服了卡尔曼跟踪滤波算法的局限性, 有效的提升了状态估计精确度。仿真实验证明了该方法在缺乏关于先验知识的情况下, 对于不同的运动形式, 均取得了较好的自适应性与鲁棒性。

Abstract: In order to improve the state estimation performance which belongs to target tracking, the interactive multiple model particle filter (IMMPF) adopts IMM to describe target movement, and estimate the target state by particle filters. IMMPF can avoid estimation error caused by single motion model. It also overcomes the limitation of Kalman tracking filter. When the priori knowledge is inadequate, IMMPF can estimate target position, velocity and acceleration with appropriate error under different form of exercise. So IMMPF improves adaptability and robustness.

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