

研究、探讨

差分线性化EKF滤波方法研究

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摘要 针对扩展卡尔曼滤波(EKF)框架下非线性模型线性化时雅可比矩阵计算复杂且精度难以保证的情况, 提出一种基于差分线性化的EKF算法。该方法用目标位置的量测值和状态一步估值作差分的方法代替雅可比阵的计算。通过蒙特卡洛仿真表明, 差分EKF在保证跟踪精度的前提下, 大大简化了复杂的求导运算, 适合于实际的跟踪系统应用。

关键词 [非线性滤波](#) [扩展卡尔曼滤波](#) [雅可比矩阵](#) [差分线性化](#)

分类号

Research of EKF based on differential linearization

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Abstract

The Jacobi matrix is the key of nonlinear model's linearization in the EKF framework. Generally, the calculation is complex and is hard to get the satisfied precision. To solve this problem, this paper introduces a kind of EKF based on difference-linearization. In this method, the calculation of Jacobi matrix is replaced by the difference-calculation between the measurement of target's position and the one-step estimation of target's status. This paper has the Monte Carlo simulation for the difference-linearization EKF. The result shows that this method simplifies the derivation in EKF and ensures the tracking precision. It is suitable to the engineering application.

Key words [nonlinear filtering](#) [extended Kalman filter](#) [Jacobi matrix](#) [difference-linearization](#)

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