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一种改进的类高斯和粒子滤波在大失准角传递对准中的应用

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Application of an Improved Gaussian-like Sum Particle Filter to Large Misalignment Transfer Alignment

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摘要

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摘要

在小失准角传递对准模型基础上提出了一种大失准角下的速度加姿态匹配的传递对准模型;针对模型中存在的非线性和非高斯性问题,根据二阶马尔可夫过程的时域特性,提出了一种改进的采用类高斯和重采样的粒子滤波算法。理论分析证明了大失准角下传递对准模型和小失准角下传递对准模型的一致性。小失准角下的仿真验证了大失准角传递对准模型的正确性;大失准角下的仿真结果表明在大失准角的非线性、非高斯状态下,相比传统粒子滤波算法只稍微增加了计算量,而传递对准的精度提高了大约40%。

关键词: 传递对准 大失准角 马尔可夫 粒子滤波 重采样

Abstract:

On the basis of small misalignment transfer alignment models, a velocity plus attitude matching large misalignment transfer alignment model is treated in detail. For the non-linear and non-Gaussian features of the model, an improved particle filter using Gaussian-like sum resample function is proposed by analyzing the time-domain characteristics of the second-order Markov process. Theoretical analysis shows the unity of large misalignment transfer alignment model and small misalignment transfer alignment model. The simulation with small misalignment verifies the validity of the large misalignment transfer alignment model. And the simulation with large misalignment shows that the accuracy of transfer alignment with non-linear and non-Gaussian features is improved by about 40% with small amounts of increment of calculation.

Keywords: transfer alignment large misalignment Markov particle filtering resampling

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