

GPS辅助捷联惯导系统动基座初始对准新方法

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摘要：

针对捷联惯导系统（SINS）初始对准问题，提出了一种无需经历传统的粗对准阶段而利用单天线GPS辅助直接进行动基座精确初始对准的新方法。该方法以惯性空间为参考基准，将初始对准姿态矩阵的分解为三部分逐一实现，进一步对动基座对准进行了误差分析，指出了利用停车零速信息可以提高初始对准精度的思路。最后，载车运动环境下的初始对准试验结果表明，航向角对准精度达到了 0.081° (1σ)。

关键词：捷联惯导系统，动基座初始对准，GPS，载车试验

A new GPS Aided Initial Alignment Algorithm for SINS on Moving Base

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Abstract:

On the moving base, a new single-antenna GPS aided initial precise alignment algorithm for strapdown inertial navigation system (SINS) is proposed and the classical coarse alignment stage is unnecessary in the algorithm. In this paper, two special inertial frames are defined and are selected as the computing reference frames, then, the calculation of initial alignment direction cosine matrix (DCM) is expanded into three parts which are given in detail. Moreover, the alignment errors are analyzed and the conclusion is drawn that the zero velocity of vehicular stopping can be used to improve alignment accuracy. In the end, some vehicular tests were carried out on moving base and the accuracy of azimuth reaches about $0.081^\circ(1\sigma)$.

Keywords: SINS; in-movement initial alignment; GPS; vehicular test

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