

论文 射频与基带参考时钟不同源对GPS载波相位平滑伪距定位的影响

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摘要:

无论GPS接收机的射频和基带参考时钟是否同源,都不会影响伪距定位。然而,对于载波相位平滑伪距定位,本文的理论分析表明:在新增卫星时,射频和基带参考时钟不同源将使新增星和原有星的平滑伪距钟差产生偏差,进而导致大幅度定位误差。在时钟同源和不同源两种条件下,利用自研的GPS基带芯片“航芯2E”,开展了大量硬件实验,验证了理论分析的正确性。论文得出的载波相位平滑伪距定位的接收机其射频和基带参考时钟必须同源的结论,对于GPS射频和基带芯片的模块化、系列化的规划和设计具有指导意义。

关键词: 载波相位平滑伪距定位 钟差 同源参考时钟 新增卫星

The effect of different RF and baseband reference clocks on GPS positioning using carrier phase smoothing code pseudorange

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Abstract:

GPS code pseudorange positioning is not affected no matter whether the reference clocks of RF and baseband are from the same oscillator or not. However, for carrier phase smoothing code pseudorange positioning, theoretical analysis in this paper shows that as some new satellites become visible, a clock bias difference between the new and old satellites' smoothed pseudoranges occurs, due to different oscillators used by RF and baseband, and it leads to a considerable positioning error. Under the conditions of the same oscillator and two different oscillators used by RF and baseband, sufficient hardware experiments have been carried out by using the self-developed GPS baseband chip HangXin 2E. The correctness of the theoretical analysis has been verified by the experiment results. In this paper, the conclusion that the reference clocks of RF and baseband must be from the same oscillator makes a guidance sense for planning and design of modularization and serialization of GPS RF and baseband chip.

Keywords: carrier phase smoothing code pseudorange positioning clock bias reference clocks from one oscillator; increase satellite

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