电子与信息学报
JOURNAL OF ELECTRONICS & INFORMATION TECHNOLOGY

电子与信息学报 » 2011, Vol. 33 » Issue (10) :2521-2525 DOI: 10.3724/SP.J.1146.2011.00270

一种高动态、弱信号GPS比特同步方法

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A GPS Bit Synchronization Method for High-dynamic and Weak Signal

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摘要 为了实现高动态、弱信号条件下的GPS信号的比特同步，该文提出了一种基于差分相干累加的比特同步方法，简称差分累加法。该方法将一个导航数据比特周期内的复相干积分值与间隔为整数位导航数据比特长度的相应值进行差分相干累加后再进行非相干累加作为统计量，计算20个候选位置的值，最大值对应的差分相干累加起始位置即为导航数据比特边界位置，从而实现比特同步。仿真结果表明，差分累加法适合高动态、弱信号GPS比特同步。

关键词： GPS 弱信号 高动态 比特同步 差分累加

Abstract： In order to achieve bit synchronization of high-dynamic and weak GPS signal, a bit synchronization method based on differential coherent accumulation is proposed, called differential accumulation method. With this method, every one of complex samples after coherent integration within a navigation data bit period is multiplied with the conjugated of the previous corresponding sample that the interval between them is an integer number of navigation data bit length and the product is accumulated, and then non-coherent accumulated as a statistic to calculate the value of the 20 candidate locations, the starting position of differential coherent accumulation corresponds with the largest value is determined as navigation data bit boundary position to perform bit synchronization. Simulation results show that the differential accumulation method is suitable for high-dynamic, weak GPS signal bit synchronization.

Keywords： GPS Weak signal High-dynamic Bit synchronization Differential accumulation

Received 2011-03-23;

本文基金:

国家973计划项目(2009CB320405)和国家科技重大专项(2010ZX03005-002)资助课题

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引用本文:

李新山, 郭伟, 谢先斌.一种高动态、弱信号GPS比特同步方法[J] 电子与信息学报, 2011,V33(10): 2521-2525

Li Xin-Shan, Guo Wei, Xie Xian-Bin.A GPS Bit Synchronization Method for High-dynamic and Weak Signal[J] , 2011,V33(10): 2521-2525

链接本文:

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2011.00270 **或** http://jeit.ie.ac.cn/CN/Y2011/V33/I10/2521