

航天电子技术

GPS接收机的多星盲干扰抑制方法

王纯¹, 张林让¹, 黄庆东^{1, 2}, 刘昕¹

1. 西安电子科技大学雷达信号处理国家重点实验室, 陕西 西安710071;
2. 西安邮电学院通信工程系, 陕西 西安 710121

摘要:

考虑到GPS接收机需要解算至少4颗卫星的发射信号从而实现定位, 而GPS接收机工作在复杂的电磁环境下, 受大量人为干扰的影响, 无法有效接收多颗卫星的发射信号从而实施解算定位。提出了一种新的用于GPS接收机的多星盲干扰抑制方法。由于接收机对每颗卫星的测距码(如C/A码)已知, 采用基于最小二乘法的多目标自适应阵列剔除多颗期望卫星方向外的干扰信号。该方法无需期望卫星的位置信息和估计干扰信号的导向矢量, 且期望卫星数目不受阵元数目的限制。仿真结果表明, 该算法不仅能有效地抑制多种干扰, 而且可以精确估计出多颗期望卫星的方位角。

关键词: GPS接收机 盲干扰抑制 自适应阵列 测距码

Blind interference suppression method for multiple desired satellite in GPS receiver

WANG Chun¹, ZHANG Lin-rang¹, HUANG Qing-dong^{1,2}, LIU Xin¹

1. National Lab of Radar Signal Processing, Xidian University, Xi'an 710071, China;
2. Department of Communication Engineering, Xi'an University of Posts and Telecommunications, Xi'an 710121, China

Abstract:

The process of positioning requires at least pseudo range measurements to four satellites. However, strong interference, even it is intentional, makes the receiver unable to obtain measurements from the multiple GPS satellites. A novel blind interference suppression method is proposed for the GPS receiver. Combined with the knowledge of each desired satellite's C/A code, a multi target adaptive array based on minimum mean square error (MMSE) algorithm is employed for interference suppression of multiple satellites. The proposed method can mitigate the jammers beyond the direction of desired satellites without the location knowledge of desired satellites and estimation of the steering vector. Moreover, the number of desired satellites is not limited by the number of antennas. Numerical examples demonstrate that the method can not only effectively suppress various interferences but also estimate accurately the angle of arrival information of the multiple desired satellite signals.

Keywords: GPS receiver blind interference suppression adaptive array C/A code

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通讯作者:

作者简介:

作者Email:

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