

Abstract

Mohamed E.Tamazin

A New High-Resolution GPS Multipath Mitigation Techniques Using Fast Orthogonal Search

The Delay Locked Loop (DLL) tracking algorithm is one of the most widely used in GPS receivers. It uses different correlators such as the Early-Late Slope (ELS) correlator and High-Resolution Correlator (HRC) to mitigate code phase multipath. These techniques are effective for weak multipath environments but they may not be suitable for challenging multipath environments. The Multipath Estimating Delay Lock Loop (MEDLL) shows better performance than the classical methods. However, MEDLL still has limited capabilities in severe multipath environments. This paper introduces a robust multipath mitigation technique based on fast orthogonal search to obtain better delay estimation for GPS receivers. This research utilised a SPIRENT Global Navigation Satellite Systems (GNSS) simulator to compare the performance of the proposed method with other multipath mitigation techniques. Experimental results demonstrated that the performance of the proposed algorithm was better than the classical and advanced techniques under the multipath scenarios tested.