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THE POSITIONING PERFORMANCE ANALYSIS FOR INTEGRATED SATELLITE SYSTEM OF CPS/GPS

Abstract

Compass Positioning System(CPS)termed as the Beidou System, or Twins-Satellites System, is the satellite navigation system of China. Although the second generation CPS is to be a global navigation satellite system, there are only five navigation satellites currently and four ones in Geostationary Earth Orbit. It is still regional system now and its positioning performance is not good, especially in low latitude areas such as South China Sea.

To improve the precision of the current CPS, the integrated satellite system, consists of the CPS and GPS, is discussed here. The key to improve positioning performance of CPS is considered to send the navigation message with more satellites which should be good geometric construction with the CPS satellites, so the current CPS are supposed to work together with GPS.

The plan adopts point positioning with code pseudo-range algorithm. Maximum Optimal Geometric Dilution of Precision (MOGDOP) and Average Optimal GDOP (AOGDOP) are used to evaluate the positioning performance of new plans. MOGDOP is the maximum of all optimal GDOP which is the smallest in all GDOP corresponding to fixed place and fixed time. It is used to estimate the worst positioning precision in the limited area during the available time. AOGDOP is the average of all optimal GDOP corresponding to fixed place and fixed time. It is used to estimate the average positioning precision in the limited area during the available time.

Simulation shows that the CPS with GPS could supply good positioning in low latitude better than CPS does only. Working with CPS, positioning precision of GPS could be better, especially in equator area.

Keyword: Compass Positioning System(CPS), integrated satellite system, GPS, MOGDOP, AOGDOP