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POSITIONING PRECISION ANALYSIS OF COMPASS INTEGRATED WITH GPS

Abstract

COMPASS, termed as the Beidou Navigation Satellite System, is the satellite navigation system of China. There are about seven COMPASS satellites currently in space although COMPASS is to be a global navigation satellite system. By the end of 2012, 12 satellites would be located in space as the first construction stage of COMPASS. Five ones are designed to run in Geostationary Earth Orbit. It is still regional system and its positioning performance is not good enough because constellation configuration would result in poor geometric construction of navigation satellites.

To improve the navigation performance of the current COMPASS, the system integrated with GPS is discussed here. One of the key methods to improve positioning precision of COMPASS is considered to work with more satellites, with which COMPASS satellites should be good geometric construction, so the current COMPASS are supposed to work together with GPS.

COMPASS/GPS integrated system is adopted point positioning navigation algorithm with code pseudo-range information. The new performance indexes, based on Geometric Dilution of Positioning (GDOP) of the COMPASS integrated with GPS, are researched here.

Maximum Optimal GDOP (MOGDOP) and Average Optimal GDOP (AOGDOP) are used to evaluate the positioning performance of integrated system. 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 COMPASS integrated with GPS could supply good positioning better than COMPASS does only when servicing for user in china. It is potential to solve the faults of COMPASS such as bad precision in some area when aided by GPS. Simultaneity, if working with COMPASS, positioning precision of GPS could be better, especially in equator area.

Keyword: COMPASS, integrated system, GPS, MOGDOP, AOGDOP