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# USING LEO COMMUNICATION SATELLITES TO ENHANCE NAVIGATION AND POSITIONING PERFORMANCE FOR GNSS

**Abstract**

Global Navigation Satellite Systems (GNSS) can provide time and spatial reference for intelligent transportation, and bring much convenience for people's life. With the development of navigation and positioning technologies, people need higher positioning accuracy and less positioning time, and this requires us to design better positioning schemes. Beidou System (BDS) is one of the GNSS, and will be applied in more fields in the future, so we should propose better algorithms of positioning. However, there exists contradiction between the observation time and positioning accuracy. To solve this problem, we take full advantage of large satellite geometry variations generated by fast-moving Low Earth Orbit (LEO) communication satellites, and this greatly reduces the correlation between adjacent observation time and the condition number of observation matrix, thereby improves the ill-condition of Beidou carrier phase positioning equation, thus enhances the performance of navigation and positioning. Low Earth Orbit (LEO) communication satellites will not only improve the ill-condition of Beidou carrier phase observation positioning equations, but be also helpful to reduce genetic algebra when using genetic algorithms to get ambiguity float solution, improving the location convergence speed to some extent. In single Global Navigation Satellite System, we usually use four satellites to implement positioning. But in most time, we can watch more satellites. How to choose four satellites from more visible ones has a vital influence on positioning accuracy. Therefore, we propose a new satellite selecting algorithm for BDS that bottom satellites are selected in turn after the top and the first bottom satellite are selected. The algorithm selects the optimal satellites for navigation and positioning by making full use of available information, and improves real-time performance. In addition, the proposed algorithm is simple, practical and easy to implement.