

Long-Baseline Single-epoch RTK Positioning Method Based on BDS-3 and Galileo Penta-Frequency Ionosphere-Reduced Combinations

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Abstract : In order to take full advantages of the BDS-3 penta-frequency signals in the long-baseline RTK positioning, a long-baseline RTK positioning method based on the BDS-3 penta-frequency ionospheric-reduced (IR) combinations is proposed. First, the low noise and weak ionospheric delay characteristics of the multi-frequency combined observations of BDS-3 is analyzed. Second, the multi-frequency extra-wide-lane (EWL)/ wide-lane (WL) combinations with long-wavelengths are constructed. Third, the fixed IR EWL combinations are used to constrain the IR WL, then constrain narrow-lane (NL) ambiguities and start multi-epoch filtering. There is no need to consider the influence of ionospheric parameters in the third step. Compared with the estimated ionospheric model, the proposed method reduces the number of parameters by half, so it is suitable for the use of multi-frequency and multi-system real-time RTK. The results using real data show that the stepwise fixed model of the IR EWL/WL/NL combinations can realize long-baseline instantaneous centimeter-level positioning.

Keywords : penta-frequency, ionospheric-reduced (IR), RTK positioning, long-baseline

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