Realization of Relative Positioning based on BDS un-differenced observations

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This paper reviews the history and evolution of the relative positioning based on the un-differenced observation data, and explain its internal mechanism according to the error division. It adopts the method that through estimating quasi-clock parameter which absorbed the un-modeled error of the receiver and the satellite, and eliminate the common error remarkably with double-differenced measurement. Various relative positioning experiments are carried out in this paper to demonstrate the flexibility of using un-differenced , including network resolving, static/ kinematic resolving and kinematic for kinematic relative positioning based on the un-differenced observation of BDS regional Navigation Satellite System.

As regards positioning precision, in the case of the use of BDS post precision orbit, for thousands of kilometers long(5000 to 2000) of the baseline, the repeatability of horizontal direction of the coordinates can be reached within the range of 11mm, the repeatability precision of the vertical direction is less than 3cm , the satellite antenna phase center and receiver antenna phase center has not been accurately calibrated, and current precision of the BDS satellite orbit there is still a gap with the GPS the relative positioning precision of the BDS long baseline conditions are also need to be improved. When the broadcast ephemeris adopted, for the static baseline 800 meters, the repeat precision of the horizontal direction is 3mm, the elevation direction is 8mm, for 30 km horizontal static baseline, the repeat precision of the horizontal direction is less than 10mm, the elevation direction is 13mm; for the dynamic baseline and dynamic benchmark solutions, both horizontal and vertical precision are in several cm ,on the latter, because the initial coordinates of base station is not accurate, the precision is slightly worse.