

The GNSS Carrier Phase Resolution through Parallel Operation of Ambiguity Function Method and Ambiguity Search Technique

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Abstract: The global navigation satellite systems have been operated for many years. Generally, the carrier phase is more accurate than the pseudorange. The key point of accurate and precise application of global navigation satellite systems is how to solve the problem of integer unknown, phase ambiguity, correctly.

The ambiguity resolution problem is a mixed integer-real valued parameter adjustment problem. This problem cannot be solved by standard parametric adjustment models. In these years, there are two ways for ambiguity resolution: ambiguity function method and ambiguity search technique.

The former is eliminate the integer unknown parameter through mathematical method. Then this problem can be simplified to a standard real valued adjustment and solved by using standard parametric adjustment model directly. The advantage of ambiguity function method is quick because it is determining the answer directly. But it needs more accurate initial values for iteration.

The ambiguity search technique uses searching; it is a method likes trial and error. It determines a float estimation of integer unknown through standard parametric adjustment models. Then an answer will be chosen from several candidates nearby the float estimation through searching. The advantages and disadvantages of search technique are just reverse of ambiguity function method. The search technique needs more time for trial and error of candidates when the number of satellite is larger. But the influence of initial values for iteration is smaller.

This research is trying to combine the two methods. The advantages and disadvantages of two methods would be consolidated in order to achieve improved.

Keyword: Phase Ambiguity, Ambiguity Function Method, Ambiguity Search Technique