GNSS Ambiguity Fixing through a Partial Ambiguity Resolution Method

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Abstract: The Global Navigation Satellite Systems (GNSS) in navigation, geophysics and surveying have widely used in recent decades. However, the demand has increased such as the requirements on precision, accuracy, reliability and availability. Therefore, in order to achieve the stringent with respect to precision, integrity and real-time positioning, carrier phase measurements are necessary. While using carrier phase measurements for positioning, the key point is how to obtain the integer ambiguity correctly and efficiently. For solving this problem, many integer ambiguity resolution algorithms have been developed, such as LAMBDA, LLL, or eigenvalue methods. Broadly speaking, the integer estimation process has three steps: First, using the standard least-squares methods and disregard the ambiguity integer property and obtain the value called float solution. In the second step, the integer characteristic has been considered. In other words, the float solutions are mapped to integer domain and fixed. Finally, the fixed integer-valued ambiguities are used to adjust the other unknown parameters. In the real world, a successful resolution of all ambiguities, also called *Full Ambiguity Resolution* may not always be possible because several environment condition or large uncorrected biases may affect the reliability. However, the reliability of the subset ambiguities can still work, which is called *Partial Ambiguity Resolution.* The main purpose of the partial ambiguity resolution is to find the subset of ambiguities which has the largest probability of correct integer estimation.

Keywords: Global Navigation Satellite Systems, Ambiguity resolution, Partial ambiguity resolution