Efficiency of linear interpolation methods in multi reference DGPS

Davood Nejat
MSc. student in Geodesy at the Faculty of Geodesy and Geomatic Eng.,
K.N.Toosi University of Technology
dn_survey@yahoo.com
Tel: +98 9144815022
Fax: +98 21 88786213

Dr. Behzad Voosoghi
Assistant Professor of the Faculty of Geodesy and Geomatic Eng.,
K.N.Toosi University of Technology
vosoghi@ kntu.ac.ir
Tel: +98 21 88770218
Fax:+98 21 88786213

ABSTRACT

Precise DGPS surveying and navigation is restricted to short range case because of presence of distance dependent biases in double-differenced observables and receiver single-differenced observables. In order to account for distant-dependent biases such as the atmospheric biases and orbit errors, DGPS-network based methods have been developed. In this paper linear interpolation methods (LIM) in measurement domain are performed and efficiency of these methods are compared and the advantages and disadvantages of each are disserted. Based on epoch-by-epoch and satellite-by-satellite Observables biases, reference station network generate error parameters to mitigate the user station biases. To perform these algorithms five permanent GPS stations observations in ALBORZ network in IRAN have been used. Based on results of this research LIM methods presents better accuracy in comparison with single-reference DGPS case, but height differences in region reduce efficiency of these methods.

Introduction

Real-time Single point positioning with C/A code observations enables SPS users to have position with accuracy of 10 m at the 95% probability level. A very large group of users is interested in real time accuracy at the meter level. This accuracy can be achieved by DGPS. Differential GPS (DGPS) is a technique that applies generated corrections by a GPS monitoring station also called reference station, to improve the determined position of a roving station also called user station. two correction generation methods are in use. In the first method, the reference receiver at known location calculates its position using the same set of satellites as the roving receiver. The difference (this explains notation “differential”) between the known position from calculated position yields position correction. These values are then applied to the user station receiver to obtain an improved position. In the second method difference between calculated ranges and observed (code or