IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Space-based PNT (Position, Navigation, Timing) Architectures, Applications, and Services (1)

Author: Dr. Salma Zainab Farooq
Institute of Space Technology (IST), Pakistan

Ms. Aqsa Zulfiqar
Pakistan
Mr. Shakaib Ahmad Maulai
Institute of Space Technology (IST), Pakistan

MULTIPATH EXTRACTION AND MITIGATION METHOD BASED ON WAVELET DENOISING
FOR GNSS SINGLE POINT POSITIONING

Abstract

Multipath error affects the positioning accuracy of Global Navigation Satellite Systems (GNSS). For multipath mitigation, error modelling is the first step. However, multipath error is difficult to model due to its random nature. This paper models multipath error by exploiting the relationship between satellite elevation angle and multipath amplitude. Multipath effects are reduced by applying wavelet denoising along with simple moving average on code minus carrier observations. The key idea is to extract multipath along with other low-frequency noise components from GNSS observations by directly applying wavelet denoising to observation data. The cleaner observations are processed for positioning. Four data sets (two static and two dynamic) are collected using ublox C0994 Zed F9P receiver . These datasets are tested using the proposed scheme and it is seen that the results generated after application of proposed scheme are more precise. For static data sets, the un-filtered positioning results show deviation within 1.5 meters in East and North direction. After proposed method is applied, the positioning results generated gave position deviation within decimeter range. For dynamic datasets the receiver track was seen to smoother. This simple technique of multipath reduction can be useful for better GNSS positioning accuracy.