

GPS-TEC observation using two-frequency software receiver

ASHIHARA, Yuki^{1*} ; KOMATSU, Kazuki¹

¹Dept. of Electrical Engineering, Nara National College of Technology

Global Positioning System (GPS) is a high accuracy positioning system that uses radio waves transmitted from several GPS satellites. The carrier signals of GPS satellites, there are two frequencies of L1 (1575.42MHz) and L2 (1227.60MHz). In the ionospheric plasma, the refractive index depends on the electron density. In addition, since the plasma is dispersive medium, each of L1 and L2 waves has different refractive indexes. Therefore, it is occurred propagation delay time (phase difference) in between these signals.

GPS-TEC (GPS Total Electron Contents) is a method to obtain the total electron contents along the line of satellite (LOS) from the phase difference between these signals. GPS-TEC is very useful technique to observe ionospheric electron density, but two-frequency GPS receiver is very expensive. Therefore, GPS-TEC has calculated by using GEONET data in most cases in Japan.

In the informatics and communication field, software receiver is being widely for demodulating the baseband signal, as a background of higher performance of computers. In this study, we build a software GPS receiver system, and receive the two-frequency signals. And we will evaluate the GPS-TEC data obtained by this observation.

Keywords: ionosphere, GPS-TEC, software receiver