

Effect of GPS Tropospheric Delay Neill Mapping Function Simplification

**¹Hamzah Sakidin, ¹Mohd Rizam Abu Bakar,
²Abdul Rashid Mohamed Shariff, ³Mohd Salmi Md Noorani,
⁴Abd. Nasir Matori, ⁵Azhari Mohamed**
*¹Department of Mathematics, Faculty of Science,
Universiti Putra Malaysia, Selangor
²Faculty of Engineering, Universiti Putra Malaysia, Selangor
³Faculty of Science and Technology,
Universiti Kebangsaan Malaysia, Selangor.
⁴Faculty of Civil Engineering, Universiti Teknologi Petronas, Perak.
⁵Department of Survey and Mapping Malaysia, Kuala Lumpur
E-mail: hamzahsakidin@utem.edu.my*

ABSTRACT

The mathematical modeling on the mapping function models should be revised and also simplified to improve the calculation of the GPS tropospheric delay. The zenith tropospheric delay can be amplified by a coefficient factor called mapping function to form total tropospheric delay. There are many mapping functions have been established to calculate the scale factor which can affect the total tropospheric delay. Most of the modern models have separated mapping functions for the hydrostatic and the wet part. Recently, the developed tropospheric delay models use mapping functions in the form of continued fractions which is quite tedious in calculation. There are 26 mathematical operations for Neill Mapping Function (NMF) to be done before getting the mapping function scale factor. There is a need to simplify the mapping function models to allow faster calculation and also better understanding of the models. The mapping functions for NMF models for hydrostatic and wet components are given in a form of continued fraction, whereby the elevation angle is the variable. These mapping function models have been selected to be simplified, because of their ability to achieve mapping function scale factor, down to 3 degree of elevation angle.

Keywords: tropospheric, zenith, mapping function