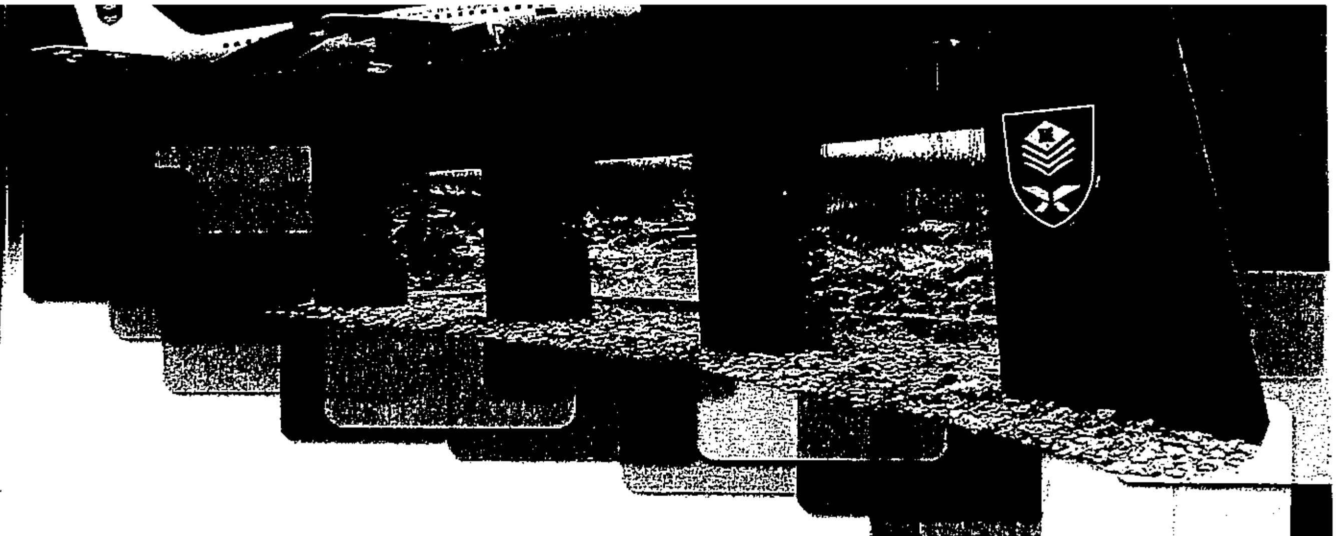

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Johor Bahru, Johor, 8 - 10 Disember 2010

ALTERNATIVE UNBabc MAPPING FUNCTION FOR TROPOSPHERIC DELAY

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The $UNBabc(E)$ mapping function models should be simplified to allow faster calculation and also better understanding of the models. Many modern mapping function models use mapping functions in the form of continued fractions which is quite tedious in calculation. There are 11 mathematical operations for $UNBabc(E)$ to be carried out before getting the mapping function scale factor. The mapping functions for $UNBabc(E)$ models for hydrostatic component is given in a form of continued fraction are to be simplified, due to its ability to calculate mapping function value down to 2 degree of elevation angle. By using linear, hyperbolic, logarithm and also regression method, the mapping function models can be simplified and at the same time can produce the same result. This model can be suggested to be an alternative to the established mapping function.

1. INTRODUCTION

Recently, the developed tropospheric delay models use mapping functions in the form of continued fractions. The Saastamoinen [1] model does not use a mapping function in the same sense as the models with continued fractions. Most of the modern models have separated mapping functions for the hydrostatic and the wet component, in a form of continued fraction [2].

The calculation for finding the mapping function scale factor, which is in a form of continued fractions are quite tedious. There are many mathematical operations (11 operations for UNBabc and 26 operations for Neill mapping function) 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 such as UNBab, UNBabc and Neill models for hydrostatic and non hydrostatic components are given in a form of continued fraction, whereby the elevation angle is the variable as shown in Figure 1.