Comparative Analysis of Geodetic Distance Computational Methods, Using the Normal Probability Statistical Plot

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SUMMARY

Abstract

There are various methods that can be used by Geodesist in carrying out computation of geodetic distance using geodetic coordinates (latitude and longitude) on the ellipsoid. Some of these methods require iterations while others need no iterations. Iterative methods are complex while non – iterative are simple and faster in performing computations. The research looks into three different geodetic computation methods which are: Bowring, Power series and Puissant. The geodetic coordinates were plotted and triangulation networks were formed. The adjoining distances sections were divided into three categories namely; short, medium and long baselines. The validity of each method with regards to the distances was used in the comparisons. One way analysis of variance (ANOVA) was performed on each method with respect to the baselines. The p – values of each of the methods were plotted on the normal probability graph for a comparative analyses. Based on the findings described in this research, conclusion was made on an appropriate method that is best for a particular baselines computation. The three methods of geodetic computation considered in this research work were actually good for computation of distances but each of the method was valid for a particular range of baselines. Bowring method is best used for long baselines computation. The accuracy of Bowring method becomes better as the baselines increases. Power series method is best used for short and long distances. Puissant method was valid for both short and medium baselines.

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