

Local Ionospheric Modeling Based on GPS Observations at the Permanent GPS Stations

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SUMMARY

Development of Global Navigation Satellite Systems (GNSS) and their wide application has necessitated more accurate position information at a daily base. During the period of no S/A implementation, the major source of GNSS errors is the ionospheric error. This error can be completely removed via linear combination of L1 and L2 carrier phase observation in case of GPS, for example. Such removal of ionospheric error is not possible for single frequency GPS receivers, yet the users of such receivers are demanding more possible accuracies of positioning. In this paper we are presenting a method for GNSS ionospheric modeling based on GPS observations at permanent GPS stations.

Our method differs from previous contribution as we do not aim at TEC modeling but only using computed coordinates of a permanent GPS station as a time series and applying the correlation between the observations as a signal for modeling and prediction of ionospheric errors. Our approach is based Box & Jenkins method of time series analysis and application of ARIMA model. The theoretical details of the method and numerical results of the case studies, i.e. permanent GPS stations of European Reference Frame (EUREF) are presented in the paper.

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