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IMPROVED ORBIT DETERMINATION ACCURACY OF IRNSS SATELLITE USING COMBINED FILTER SMOOTHER METHOD

Abstract

Indian Regional Navigation Systems (IRNSS) is a Global Positioning System (GPS)-like navigation system which is currently planned to provide navigation solution within India and 1500Km around India. The signal in space broadcasts satellite ephemeris and satellite clock coefficients which are the primary navigation parameters. Though the determination of these parameters are performed in real time using filtering technique, the broadcast parameters will be uplinked once in day or as and when needed. Hence there is a scope to improve the accuracy of these estimated parameters as these parameters were not uplinked in real time. Thus even though real time filter performance is better, in order to have much more improved accuracy the combination of filter smoother method is adopted. The accuracy improvement is thus be accomplished by applying the Forward Backward Forward Extended Kalman Filter (FBFEKF). This strategy can outperform the standard Extended Kalman Filtering techniques. In this paper we discuss the methods results and comparison between these methods with IRNSS simulated range measurements. In addition these methods were applied on other Global Navigation Satellite System (GNSS) real measurements and their results were also presented.