



Anomaly Detection of IGS Predicted Orbits for Improvement of Near-Real-Time Positioning Accuracy Using GPS

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IGS ultra-rapid orbits consist of observed half and predicted half. The predicted orbits are suitable for real-time or near-real-time positioning. In this paper, we detected anomalies of the IGS predicted orbits using NANUs (Current Notice Advisories to NAVSTAR Users) messages and IGS BRDCs (Broadcast Ephemerides). IGS predicted orbits were used for anomalies detection. As a result, in case of using NANU-only, we can get detection performance of 88%. And we can achieve detection performance of 95% when both of NANUs and BRDCs were used. And also, we analyzed near-real-time positioning accuracies of precise point positioning technique using IGS predicted orbits. As a result, we could get the mean errors of 1~1.6 cm, standard deviation of 1~1.3cm. These results were similar level to positioning accuracy using the IGS rapid orbits. Positioning errors of >10 cm were, however, showed 44% of observed days of orbital anomalies. When the orbital anomalies of the predicted orbits were shown, maximum error was 1.7 km. From this study, we conclude that check and consideration were necessary before using the IGS predicted orbits.