

GPS/INS Integration Using Kalman Filtering for Navigation

Yashar BALAZADEGAN, Siavash HOSSEINI and Mohammad RAJABI, Islamic Republic of Iran

Key words: GPS, INS, Kalman filtering, navigation, loosely coupled, integration, differential GPS

SUMMARY

The need for a positioning system which works in different environmental conditions has led the researchers to use medium accuracy INS aided with GPS. In spite of all the advantages that GPS has, there are times when its signal is lost and is not able to provide any position. Moreover, its data rate is not high enough for some applications. On the other hand, INS is an autonomous system and not only can provide position in any environment but also its data rate is very high.

Most of the positioning errors in GPS are due to the propagation media. In other words, GPS errors do not accumulate over time and in long term the position accuracy is relatively high. But on the contrary, INS errors accumulate over time which means that the position accuracy is high in short times. It is seen that these two systems are complementary and can cover each others weaknesses. In this paper medium accuracy INS is integrated with DGPS using Kalman filter. The loosely coupled method has been adopted for integration purpose. Experimental results show that when the GPS signals are lost and the dynamics of the platform is low, the positional accuracy reaches to about 18 m after 250 seconds.

CONTACTS

Mr. Yashar Balazadegan
Graduate student
University of Tehran
Dept. of Geomatics Engineering
Tel. + 98 21 8800 8841
Fax: + 98 21 8800 8837
Email: yashar.balazadegan@gmail.com
14395-515 Tehran
IRAN (Islamic Republic of)

Mr.Hosseini, Siavash
Email: siavash_2003_tbz@yahoo.com

Mr.Rajabi, Mohammad
Email: marajabi@ut.ac.ir