A LOW−COST GPS AIDED INERTIAL NAVIGATION SYSTEM FOR VEHICLE APPLICATIONS (WedPmOR4)

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Abstract :

In this paper an approach for integration between GPS and inertial navigation systems (INS) is described. The continuous−time navigation and error equations for an earth−centered earth−fixed INS system are presented. Using zero order hold sampling, the set of equations is discretized. An extended Kalman filter for closed loop integration between the GPS and INS is derived. The filter propagates and estimates the error states, which are fed back to the INS for correction of the internal navigation states. The integration algorithm is implemented on a host PC, which receives the GPS and inertial measurements via the serial port from a tailor made hardware platform, which is briefly discussed. Using a battery operated PC the system is fully mobile and suitable for real−time vehicle navigation. Simulation results of the system are presented.

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