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1G2A IMU\GPS Integration Algorithm for Land Vehicle Navigation

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Abstract : A general decline in the cost, size, and power requirements of electronics is accelerating the adoption of integrated GPS/INS technologies in consumer applications such Land Vehicle Navigation. Researchers are looking for ways to eliminate additional components from product designs. One possibility is to drop one or more of the relatively expensive gyroscopes from microelectromechanical system (MEMS) versions of inertial measurement units (IMUs). For land vehicular use, the most important gyroscope is the vertical gyro that senses the heading of the vehicle and two horizontal accelerometers for determining the velocity of the vehicle. This paper presents a simplified integration algorithm for strap down (ParIMU)\GPS combination, with data post processing for the determination of 2-D components of position (trajectory), velocity and heading. In the present approach we have neglected earth rotation and gravity variations, because of the poor gyroscope sensitivities of the low-cost IMU and because of the relatively small area of the trajectory.

Keywords : GPS, ParIMU, INS, Kalman filter
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