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» Abstract

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Category	Inertial Systems for Positioning & Orientation
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Title of the Paper	Allan Variance Analysis on Error Characters of MEMS Inertial Sensors for an FPGA-based GPS/INS System
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Abstract	<p>Abstract</p> <p>The combination of GPS/INS provides an ideal navigation system of full capability of continuously outputting position, velocity, and attitude of the host platform. However, the accuracy of INS degrades with time when GPS signals are blocked in environments such as tunnels, dense urban canyons and indoors. To dampen down the error growth, the INS sensor errors should be properly estimated and compensated before the inertial data are involved in the navigation computation. Therefore appropriate modelling of the INS sensor errors is a necessity. Allan variance is a simple and efficient method for verifying and modelling these errors by representing the root mean square (RMS) random drift error as a function of averaging time. The Allan variance can be used to determine the characteristics of different random processes. This paper applies the Allan variance to analyse and model different types of random errors residing in the measurements of MEMS inertial sensors. The derived error model will be further applied to a low-cost GPS/MEMS-INS system once the correctness of the model is verified. The paper gives the detail of the Allan variance analysis as well as presents the test results.</p>
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