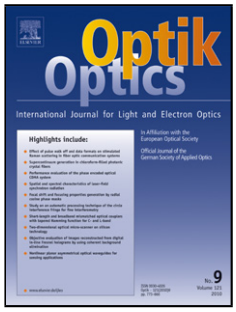

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Equation Chapter 1 Section 1

Research on virtual gyro configuration of redundant MEMS system based on ANFIS

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Equation Chapter 1 Section 1

Abstract: In order to improve the accuracy and performance of low-accuracy MEMS inertial devices, a new method about virtual gyro construction based on ANFIS is presented, by learning mechanism and reasoning ability of fuzzy reasoning method. Error characteristics of redundant MEMS gyroscopes are analyzed with Allan method, error model of redundant gyros are built, and a "virtual" gyroscope with higher precision is gotten. The newly system with virtual gyroscopes by the presented method is testified by simulation results, and it shows that the attitude error is reduced, and the accuracy of the optimized MEMS system composed of "virtual" gyros based on ANFIS is improved.

Key words: redundant MEMS system; Allan; virtual gyro; ANFIS; configuration.

Introduction

In recent years, the MEMS inertial sensor has been rapid developed in the global scope. On one hand, volume and price are required in civilian area, so MEMS devices are gradually integrated, cost lowed. On another hand, MEMS devices are also tend to be greatly improved to replace the fiber series of low accuracy in military field, so the corresponding price will increase as well.

It’s hot to Study how to improve the accuracy and performance of low-accuracy MEMS inertial devices. As to rotating modulation technology, the rotation mechanism is increased to modulate the error characteristic of MEMS device, so as to improve the performance of MEMS system [1]. Otherwise, a method of optical flow /GPS assisted MEMS by UKF is presented, to