Reduce the Offset in Micromachined Lorentz Force Magnetometer by Current Chopping

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ABSTRACT

Researchers have developed a novel method to reduce the offset in micromachined Lorentz force magnetometer by current chopping.

FULL DESCRIPTION

Many efforts have been made to improve the sensitivity and resolution of magnetic sensors. Lorentz force magnetic sensor is one of the emerging technologies for magnetic sensors. Lorentz force magnetic sensors with sensitivity and resolution comparable or better than Hall-effect sensors have been reported recently. Compared to Anisotropic Magnetoresistive sensors and Hall-effect sensors that are commonly used in portable electronics, they have the benefits of free of magnetic material and hysteresis. Lorentz force magnetometers are also CMOS compatible and can be co-fabricated with other Micro-electro-mechanical systems inertial sensors, such as accelerometers and gryoscopes.

Offset is another key parameter that influences the performance of magnetic sensors. It reduces the dynamic range of the system and also results in drift error, which directly transfers to angle error when used as a compass. Methods of reducing the offset and drift error for AMR sensors and Hall-effect sensors have been reported. However, offset and drift error in the Lorentz force magnetometer has not been well studied yet.

Researchers at the University of California, Davis have developed a novel method to suppress the offset and drift error in micro-machined Lorentz force magnetic sensors. By switching the polarity of the Lorentz force bias current, the sensitivity of the magnetic sensor alternates its sign whereas the offset remains the same. The inventive method significantly reduces the long-term drifting of the magnetic sensor.

APPLICATIONS

- Magnetic Sensors

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,891,290	02/13/2018	2014-195

FEATURES/BENEFITS

- Eliminates the need for implementing a magnetic coil in the sensor chip in AMR
- Doubles sensitivity and only one sensor is required when compared to the Hall-effect sensors

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OTHER INFORMATION

CATEGORIZED AS

- **Engineering**
  - Engineering
- **Semiconductors**
  - Processing and Production

RELATED CASES

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