Error analysis and compensation methods for geomagnetic signal detection system

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Abstract: High-precision, high-resolution magnetic signal detection is the basis of geomagnetic matching navigation. A three-axis magnetic sensor error model and the synthesis error model for hard -iron and soft-iron magnetic interference were built based on the analysis of the error sources of the geomagnetic signal detection system. An ellipsoid fitting correction algorithm based on the character that the geomagnetic vector is constant at a fixed point was presented. The experimental results show that the ellipsoid fitting method can suppress and compensate the errors caused by the geomagnetic sensor and the external environment effectively, including errors caused by zero offset and scale factor, nonorthogonality and misalignment errors, and the hard-iron and soft-iron magnetic interference around the geomagnetic sensor.
Author Keywords: Ellipsoid fitting; Error compensation; Geomagnetic navigation; Information processing; Magnetic sensor

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