

用于磁轴承位移检测的数字式电涡流位移传感器设计与实验研究

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摘要：

磁轴承是磁悬浮飞轮、磁悬浮控制力矩陀螺的核心部件，在空间应用中的体积、重量、功耗等都有严格要求。现有的用于磁轴承位移检测的非接触式传感器输出大多是模拟信号，每个检测点都需要单独的信号线进行传输。这导致系统的体积、重量、复杂度增加，可靠性降低，抗干扰能力减弱。针对这一问题，本文提出了一种数字式电涡流位移传感器，它根据调频式的原理，通过CPLD测频的方法，在实现了对位移的高速高精度检测的同时，增强了系统的可靠性和抗干扰能力。

关键词：位移传感器；电涡流；数字式；磁轴承

Design and Experiment Study of Digital Eddy Current Displacement Sensor used for displacement detection of Magnetic Bearing

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Abstract:

Magnetic bearings are core components of magnetic flywheel and magnetic control moment gyroscope, which have strict requirements of size, weight and power consumption in space applications. The output of existing non-contact sensors used for displacement measurement in magnetic bearings is mostly analog signal, and separate signal lines are required for transmission of each detection points. This causes the size, weight and complexity of system to increase while reliability decreased and anti-jamming capability weakened. To solve this problem, a digital eddy current displacement sensor is proposed in this article, which according to the principle of Frequency Modulation and through the method of frequency measurement by CPLD, has achieved the high speed and high accuracy detection of the displacement as well as enhanced the reliability and anti-jamming capability of the system.

Keywords: displacement sensor; eddy current; digital; magnetic bearing

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