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Utilization of Digital Techniques to Improve the Quasi-Static Force Measurement of Piezoelectric Materials

This technology utilizes a novel charge measurement process coupled with an algorithm to eliminate drift in piezoelectric sensor circuits, significantly improving the accuracy of feedback-based motor control systems.

Piezoelectric sensors and conditioning circuitry have the ability to generate electric charges in response to applied mechanical stress. Previously, piezoelectric sensors and circuitry have been utilized to measure rotor position and mitigate torque ripple, respectively. However, when piezoelectric sensors and circuits are applied in a feedback loop to control a permanent magnet synchronous machine (PMSM), the sensors and circuitry can drift due to the aging of components and temperature, reducing the accuracy of the system.

Purdue University researchers have developed a novel process of measuring charge using a piezoelectric sensor. Coupled with this novel process is an algorithm that is used to eliminate drift in the measured output of the circuit that is coupled to the piezoelectric sensor.

Advantages:

-Improved accuracy of a feedback-based motor control system

Potential Applications:

-Circuitry

-Electronics industry

TRL: 2

Intellectual Property:

Provisional-Patent, 2007-05-11, United States

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Category
Semiconductors/Devices & Components
Robotics & Automation/Perception & Sensing
Automotive & Mobility
Tech/Mobility AI & Embedded Intelligence Systems

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