静电悬浮转子微陀螺悬浮控制系统的研究

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摘　要：
针对一种新颖的基于MEMS技术的静电悬浮转子微陀螺，提出了悬浮控制系统的原理和设计，并着重对Z轴悬浮控制系统的设计进行了分析，建立了Z轴方向悬浮控制系统的数学模型，通过分析扰动力对转子位移的影响，得出PID参数决定动态刚度，通过仿真结果可以看出，采用反馈线性化可补偿系统的负刚度特性，结合变预载控制实现转子的快速准确定位，为后续的旋转和加矩控制提供良好的条件。

关键词：静电悬浮控制;微陀螺;反馈线性化;变预载控制

Research on the Levitation Control System of Electrostatically Suspended Micro-gyroscope

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Abstract:
It is presented in this paper a novel electrostatically suspended gyroscope based on MEMS and the design of the levitation control system.It is especially analysed the Z axis levitation system and constructed the mathematic model of Z axis levitation control system.Trough the analysis of the disturbing force impact on the displacement of the rotor,we can draw the conclusion that the PID parameter determine the dynamic stiffness.From the simulation result we can see that the use of the feedback linearization can compensate the negative stiffness characteristic of the system.It can also realize the fast and accurate position-setting of the rotor and provide good condition for the rotary and applied moment control.

Keywords: electrostatically suspended control；micro-gyroscope；feedback linearization；variable preload control

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