

MEMS可编程光栅动态驱动电路的研制

作者: 梁庆1 苑伟政 虞益挺 乔大勇

单位: 西北工业大学 陕西省微/纳米系统重点实验室

基金项目:

摘要:

MEMS可编程光栅的工作性能很大程度依赖于驱动电路的性能。本文根据MEMS可编程光栅的工作特点及结构参数, 提取出光栅的等效电容值, 并采用集成高压运放研制出一种新型的MEMS可编程光栅的动态驱动电路。为了避免自激振荡的发生, 电路中采用了频率补偿和并联反馈电容的方法, 有效提高了电路的稳定性。实际电路经过测试, 其动态性能与PSPICE10仿真的结果非常吻合。该动态驱动电路具有高的电压输出范围(0~180V), 较高的频率响应(10kHz), 大范围容性负载能力(1~1000pF), 完全能够满足MEMS可编程光栅动态复杂控制的需要。

关键词: MEMS可编程光栅 高压运放 驱动电路 自激

Development of a dynamic driving circuit for MEMS programmable grating

Author's Name: Liang Qing, Yuan Wei-zheng, Yu Yi-ting, Qiao Da-yong

Institution: Micro and Nano Electromechanical Systems Laboratory, Northwestern Polytechnical University

Abstract:

The performance of MEMS programmable grating depends on the performance of the driving circuit to a very large extent. This paper has extracted the equivalent capacitance of the MEMS programmable grating based on its work characteristics and structure parameters, and developed an innovative dynamic driving circuit for MEMS programmable grating by using high-voltage amplifier. For avoiding self oscillation, two methods: frequency compensation and feedback capacitance respectively, have been adopted, which effectively improved the stability of the circuit. The dynamic performance of the circuit had been tested in oscillograph, which matched the PSPICE10 simulation results very well. This driving circuit has high voltage output rang(0~180V), high frequency response (10kHz) and a driving ability in wide capacitive load range (1~1000pF). It is appropriate for controlling MEMS programmable grating in complicate and dynamic conditions.

Keywords: MEMS programmable grating; high-voltage amplifier; driving circuit; self oscillation;

投稿时间: 2010-04-09

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