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DESIGN OF EXTREMELY HIGH RESONANT FREQUENCY MEMS CAPACITIVE ACCELEROMETER AND STUDY THE EFFECTS OF DIFFERENT MATERIAL/ENVIRONMENTAL PROPERTIES ON DEVICE RESONANCE FREQUENCY AND BANDWIDTH

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ABSTRACT:
In recent years, MEMS technology has widely found its application in various fields of life. MEMS actuator and sensors have become most essential components of all the electronic devices and circuits. In the field of sensors, MEMS inertial sensors have replaced almost all the conventional sensors. The present work deals with the modeling of single axis MEMS capacitive accelerometer for high frequency application based on SOI-MUMPS technology. The study is made to analyze the effects of different material properties and environmental effects on its resonance frequency/bandwidth using finite element simulation tool COMSOL Multiphysics. The accelerometer model is constructed for in-plane or transverse axis sensing with spring support provided to it. The standard model is designed using silicon material and a comparative study is done between silicon and different materials. Effect of different environmental conditions on the system damping is analyzed.

KEY WORDS: Terms-Capacitive, Inertial sensor, resonance frequency, Transverse axis sensing.
