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# Design Optimization and Analysis of Proof Mass Actuation for MEMS Accelerometer: A Simulation Study*

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In this paper, we present the design and analysis of the proof mass for capacitive based MEMS accelerometers. A study was done to determine the parameters (length of hinge and number of combs) to be optimized for the MEMS accelerometer design. The proposed design can measure the acceleration in $x$-, $y$- and $z$-axes. The design features a proof mass with interdigitated fingers along each side. These interdigitated fingers act as parallel plate capacitors. Due to acceleration, capacitance changes along the comb drive. This change in capacitance can be used to monitor the acceleration. Analysis has been carried out with different comb width designs. Using the MEMS CAD tool CoventorWare, the structure has been designed, simulated and analyzed. The process flow for the fabrication has also been proposed for the above structure. Comparative study with several designs has been made and the efficient design parameters to be considered while designing MEMS accelerometer were proposed. Based on the study, a set of optimized design parameters for the comb accelerometer were reported.

*Keywords*: MEMS; accelerometer; proof mass; comb-structure; CoventorWare; simulation; capacitive; hinge; optimization.