Title Modelling MEMS

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Abstract

Microelectromechanical systems (MEMS) combine electronics and micro-scale technology to create devices used in a variety of physical applications. A critical component of a MEMS device is the capacitor, consisting of an elastic plate situated above a fixed ground plate. When a voltage is applied to the plates, the top plate experiences deformation. Beyond a certain voltage, the top plate will make contact with the fixed plate, a phenomenon known as touchdown. Deformation of the capacitor is modeled using a fourth order partial differential equation taken on various topologies. Our work focuses on establishing a geometric framework for predicting touchdown points on regular and irregular domains containing topological defects. Through numerical and analytical techniques, we focus on analyzing the pattern of touchdown points within these more physically realistic capacitor structures. By determining the behavior of touchdown points based on parameters in the partial differential equation, we can aid in the construction optimal running MEMS devices.