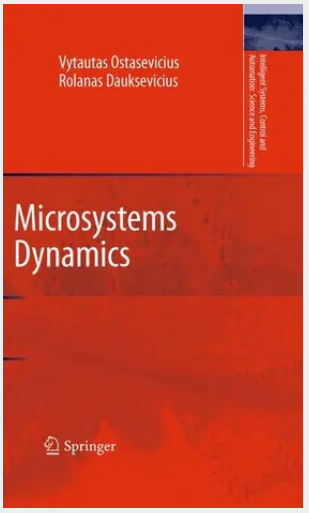
Ostasevicius / Dauksevicius

Microsystems Dynamics

In recent years microelectromechanical systems (MEMS) have emerged as a new technology with enormous application potential. MEMS manufacturing techniques are essentially the same as those used in the semiconductor industry, therefore they can be produced in large quantities at low cost. The added benefits of lightweight, miniature size and low energy consumption make MEMS commercialization very attractive. Modeling and simulation is an indispensable tool in the process of studying these new dynamic phenomena, development of new microdevices and improvement of the existing designs. MEMS technology is inherently multidisciplinary since operation of microdevices involves interaction of several energy domains of different physical nature, for example, mechanical, fluidic and electric forces. Dynamic behavior of contact-type electrostatic microactuators, such as a microswitches, is determined by nonlinear fluidic-structural, electrostatic-structural and vibro-impact interactions. The latter is particularly important: Therefore it is crucial to develop accurate computational models for numerical analysis of the aforementioned interactions in order to better understand coupled-field effects, study important system dynamic characteristics and thereby formulate guidelines for the development of more reliable microdevices with enhanced performance, reliability and functionality.

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