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Abstract

Modeling a MEMS (Micro Electro-Mechanical Systems) electrostatic actuator in electrical domain is important for system simulation of the actuator along with its associated electronics. For instance, an integrated MEMS resonator used in a serial I/O PLL design modeled in electrical domain enables to optimize the system with the rest of the electronics. In this work, we have developed a simplified equivalent circuit model for MEMS electrostatic actuator and simulated it using Natspice, a U.C. Berkeley SPICE3f5-based in-house circuit simulator. The equations governing the actuator are implemented using coupled RL and RLC circuit, defined in SPICE and Verilog-A. Natspice simulation results are presented and compared with Matlab results which show very high correlation. A system consisting of an array of MEMS devices can be quickly simulated using this simplified model.

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Keywords

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