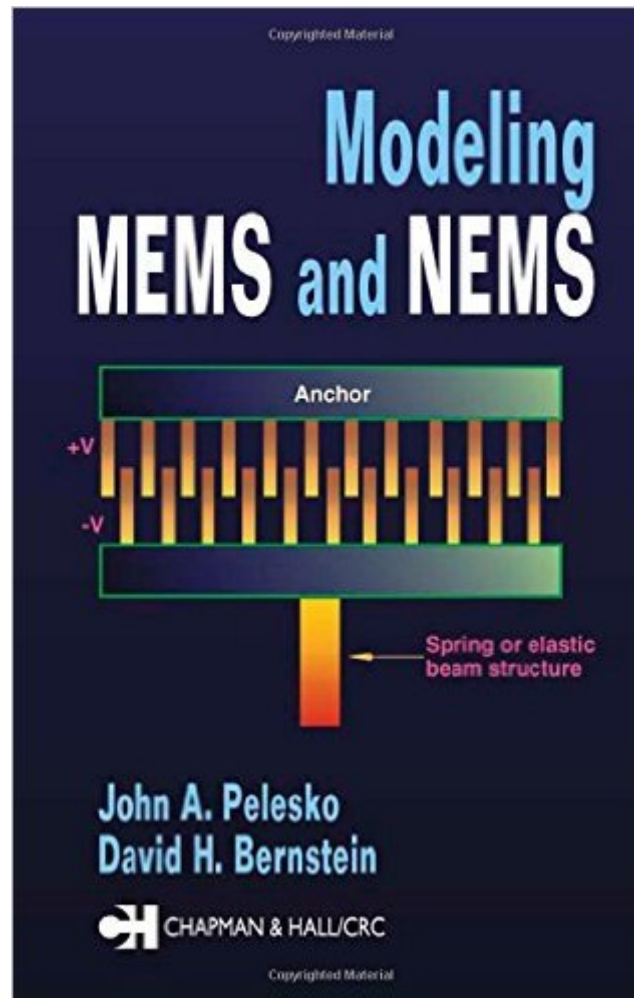


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# Modeling MEMS And NEMS



## Synopsis

Designing small structures necessitates an a priori understanding of various device behaviors. The way to gain such understanding is to construct, analyze, and interpret the proper mathematical model. Through such models, *Modeling MEMS and NEMS* illuminates microscale and nanoscale phenomena, thereby facilitating the design and optimization of micro- and nanoscale devices. After some introductory material, a review of continuum mechanics, and a study of scaling, the book is organized around phenomena. Each chapter addresses a sequence of real devices that share a common feature. The authors abstract that feature from the devices and present the mathematical tools needed to model it. They construct, analyze, and interpret a series of models of increasing complexity, then at the end of the chapter, they return to one of the devices described, apply the model to it, and interpret the analysis. In the beginning, the world of microdevices was dominated by experimental work and the development of fabrication techniques. As it matures, optimization and innovative designs are moving to the forefront. *Modeling MEMS and NEMS* not only provides the practical background and tools needed to design and optimize microdevices but it also helps develop the intuitive understanding that can lead to developing new and better designs and devices.

## Book Information

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## Customer Reviews

This is among the finest books for modeling MEMS. Most other books give a mish-mash of fabrication and modeling, but you never figure out how to model!! This one is different. This is the gold standard for MEMS books to come.. I picked it up along with many other MEMS books from the

library, never thought I would use it, but this is the ONLY book I use. Good even for the advanced MEMS designer as a quick reference. But great for a new reader who wants to grasp the fundamental of modeling.

This is a fine books that presents a basic foundation for MEMS modeling. However, I have few critiques about it:1- It does not discuss magnetostriction modeling.2- It does not discuss electro-thermal-elastic modeling (Current causes Joule heating, causing deflection).3- It does not discuss electrokinetics.Overall, it is a good start.Huy Le (teaching MEMS modeling)

The book Modeling MEMS and NEMS by John Pelesko is a great read. It is comprehensive, fun, and easy to follow for anyone who has basic math and physics skills.It is full with good examples, but the most positive argument for this book is that it illustrates the correct way of modeling the operation of a mems device: First you investigate the physics, you create a mathematical model of the MEMS device based on differential equations and find a solution, and than you try to improve on your mathematical model by use of simulations.The book doesn't get 5 stars though because it is an introduction to modeling, not the full story. At the end of the book, the story becomes incomplete. This is when the step from mathematics to computer-simulations has to be made, and this part is not half as detailed as the first, mathematical, part. You cannot model MEMS solely using analytical skills, at one point you just have to turn to simulations. J.Pelesko recognizes this and does write a good start on how to utilize computer simulations to aid the modeling.All in all, the first book for any person that needs to learn the skills for modeling MEMS and NEMS, but not the only book they should read.

The book covered lots of detailed theory on different MEMS device. A Good reference book for people who want to work on MEMS.

not as good as I expected. the author is not a good writer and does not explain the things well even in chapter 1 which is just the introduction, the introduction about MEMS scaling is just terrible, he just do one example, do the things wrong, justify the issue and the corrected not showing the whole process, why he just do not explain how to use scaling in MEMS so the reader can get a better idea about the general process using several simple examples there?A requirement for the reader is that he should know very well how to solve differential equations and a good background of calculus.the other issue that I see in the book is that the models are just very simple and that is ok for the for

explaining the phenomena but do not use any real example, he sees just the mathematical point of view but not the engineering perspective. I am very dissatisfied with this book.

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