



Noise in Semiconductor Devices: Modeling and Simulation (Springer Series in Advanced Microelectronics)

By Fabrizio Bonani, Giovanni Ghione

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Provides an overview of the physical basis of noise in semiconductor devices, and a detailed treatment of numerical noise simulation in small-signal conditions. It presents innovative developments in the noise simulation of semiconductor devices operating in large-signal quasi-periodic conditions.

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- Rank: #4511991 in eBooks
- Published on: 2013-03-09
- Released on: 2013-03-09
- Format: Kindle eBook



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Editorial Review

Review

From the reviews of the first edition:

"This book is devoted to the research and estimation of the electrical noise generated by active semiconductor devices. It provides a thorough introduction to the physics-based numerical modeling of these devices operating both in small-signal and in large-signal conditions. ... this comprehensive treatment of the numerical simulation of noise in semiconductor devices successfully combines a modern physical understanding with rigorous mathematics and numerical methods. This book should be recommended to scientists and engineers of corresponding specialties" (I. A. Parinov, Zentralblatt MATH, Vol. 1044 (19), 2004)

"Bonani and Ghione have written an excellent source book for research engineers and scientists interested in the modelling of noise in semiconductor devices. ... Compact noise models are derived from analytic models and numerical methods are presented to solve for the complex and realistic models. ... There is a useful and reasonably comprehensive bibliography. I strongly recommend this book to specialists in the area." (B. D. Nener, The Physicist, Vol. 39 (2), 2002)

From the Back Cover

The book presents a comprehensive treatment of the numerical simulation of semiconductor devices. After an overview of the basic physics of fluctuations in semiconductors, noise modelling techniques are introduced for the small-signal case. In particular, a detailed treatment is devoted to Green's function approaches such as the Impedance Field Method. Then, the numerical implementation of such approaches within the framework of multi-dimensional numerical device models is discussed in detail with reference to the customary Finite-Boxes discretization scheme. Finally, the topic of large-signal noise simulation is addressed within the framework of the Harmonic Balance approach, and implementation details are given for the non-autonomous case. The application fields covered range from low-noise, small-signal amplifiers to nonlinear circuits such as RF and microwave frequency multipliers and mixers.

Users Review

From reader reviews:

John Bennett:

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David Miller:

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