1. Record Nr. UNINA9910817129403321

Autore	Ladbrooke Peter H
Titolo	Nonlinear Design : FETs and HEMTs
Pubbl/distr/stampa	Norwood : , : Artech House, , 2021 ©2021
ISBN	1-63081-869-0
Descrizione fisica	1 online resource (373 pages)
Disciplina	621.3815/284
Soggetti	Field-effect transistors - Design and construction Modulation-doped field-effect transistors - Design and construction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Sommario/riassunto	Despite its continuing popularity, the so-called standard circuit model of compound semiconductor field-effect transistors (FETs) and high electron mobility transistors (HEMTs) is shown to have a limitation for nonlinear analysis and design: it is valid only in the static limit. When the voltages and currents are time-varying, as they must be for these devices to have any practical use, the model progressively fails for higher specification circuits. This book shows how to reform the standard model to render it fully compliant with the way FETs and HEMTs actually function, thus rendering it valid dynamically. Proof-of-principle is demonstrated for several practical circuits, including a frequency doubler and amplifiers with demanding performance criteria. Methods for extracting both the reformulated model and the standard model are described, including a scheme for re-constructing from S-parameters the bias-dependent dynamic (or RF) I(V) characteristics along which devices work in real-world applications, and as needed for the design of nonlinear circuits using harmonic-balance and time-domain simulators. The book includes a historical review of how variations on the standard model theme evolved, leading up to one of the most widely used--the Angelov (or Chalmers) model.