Abstracts

Analytically Unified DC/Small-Signal/Large-Signal Circuit Design

This paper exploits the inherent analytical relationship between the dc, small-signal, and harmonic balance circuit equations. This provides the basis for unified dc, small-signal, and large-signal analyses using a single nonlinear circuit description. Our approach ensures consistent circuit simulation results and permits simultaneous optimization of dc, small-signal, and large-signal responses with multidimensional specifications. Applying this concept to FET parameter extraction leads to nonlinear device models suitable for both small-signal and large-signal analyses. We also demonstrate simultaneous small-signal and large-signal minimax optimization of an FET broadband amplifier to extend the dynamic operating range.

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