講演概要

The design of RF/microwave power amplifiers (PA) with high power- efficiency is of critical importance for realizing eco-friendly modern communication systems.
In the search for the optimal power-efficient PA operation, designers are relying on waveform engineering at the current generator reference planes of the transistors to minimize the power dissipated by the transistor. However, a huge design space must be explored in simulations to find the source and load multi-harmonic impedance terminations required at the package to realize the desired optimal internal current and voltage waveforms. A new design paradigm has emerged in which a nonlinear embedding device model is used to synthesize in a single simulation the required multi-harmonic optimal source and load terminations at the package sustaining the desired textbook internal waveforms. Thus the embedding model greatly facilitates the design of PAs of various classes.
Examples of broadband amplifiers such as class-J and continuous class- F PAs designed with it will be presented. The embedding model can also be used in the design of multi-transistor PA architectures such as Doherty and Chireix PAs. These PA architectures can provide a high average power efficiency when operating with communication signals with large peak-to-average power ratios such as LTE. Practical design examples for both the Doherty and the Chireix amplifiers will be presented to demonstrate how the embedding device model greatly facilitates their design.