Graduate Seminar (EEL 6936)
Department of Electrical Engineering

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Chemistry Building, Room 111 (CHE 111)

Simulation-Based Microwave Design Using Equivalent Circuit and Data-File Based Models

Abstract

For many years, S-parameter data files have been the default industry standard for representing passive surface mount devices in the microwave industry. In many cases, however, S-parameter file models fall short in terms of equipping designers with the simulation capability that is needed for circuit design success. In contrast, properly-extracted equivalent circuit model can avoid many inherent limitations of data file representations and, as is the case of Modelithics CLR Library models, provide for extrapolation, scaling, and statistical yield analyses not easily accomplished with S-parameters alone. Hence in this talk, examples will be presented to illustrate common problems and solutions that can be accomplished with Modelithics "Global Models." (USF Patented).

For those interested in power amplifier development, at the core of successful simulation-based PA design, are sufficiently-accurate non-linear models for the desired power transistors. Today, both non-linear equivalent circuit, or compact models, as well as X-parameter™ models[1] are available as proven building blocks for PA designs. Both types of models are useful. Among other advantages, X-parameter models can lead to faster large signal simulations and optimizations. Compact models are easier to scale and as the name implies, and can represent a wide range of operating conditions without the large data file storage requirements that can sometimes accompany X-parameter models.

Biography

Lawrence P. Dunleavy co-founded Modelithics, Inc. in 2001 to provide improved modeling solutions and high quality microwave measurement services for RF and microwave designers. He is currently serving as President & CEO at Modelithics. He also maintains a part-time position as a tenured Professor within USF's Department of Electrical Engineering, where has been on the faculty since 1990. Prior to this he worked for Hughes Aircraft and E-Systems companies. Dr. Dunleavy received the B.S.E.E. degree from Michigan Technological University in 1982, and the M.S.E.E. and Ph.D. degrees in 1984 and 1988, respectively, from the University of Michigan. Dr. Dunleavy is a Senior Member of IEEE, and is active in the IEEE MTT Society, and the Automatic RF Techniques Group (ARFTG).

1 X-Parameters is a trademark of Agilent Technologies, Inc The X-parameters format and underlying equations are open and documented.