Abstracts

Nonlinear Circuit Analysis of Harmonic and Intermodulation Distortions in Laser Diodes Under Microwave Direct Modulation

S. Iezekiel, C.M. Snowden and M.J. Howes. "Nonlinear Circuit Analysis of Harmonic and Intermodulation Distortions in Laser Diodes Under Microwave Direct Modulation." 1990 Transactions on Microwave Theory and Techniques 38.12 (Dec. 1990 [T-MTT] (1990 Symposium Issue)): 1906-1915.

A microwave nonlinear circuit analysis technique which can account for all known steady-state responses has been developed and applied to the large-signal characterization of directly modulated laser diodes. An equivalent circuit derived from the rate equations is used to model the laser diode. The proposed technique is based on a harmonic balance algorithm which represents two-tone inputs by describing frequencies. Second-harmonic and third-order intermodulation distortion results for a single-mode GaAlAs diode have been compared with corresponding measured data to validate the method. Aperiodic responses are detected by means of bifurcation theory prior to the harmonic balance analysis and are simulated in the time domain.

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