Abstracts

Jacobian Calculation Using the Multidimensional Fast Fourier Transform in the Harmonic Balance Analysis of Nonlinear Circuits (Short Papers)

P.L. Heron and M.B. Steer. "Jacobian Calculation Using the Multidimensional Fast Fourier Transform in the Harmonic Balance Analysis of Nonlinear Circuits (Short Papers)." 1990 Transactions on Microwave Theory and Techniques 38.4 (Apr. 1990 [T-MTT]): 429-431.

A technique is developed whereby the gradient of frequency-domain simulation variables may be analytically determined using time-domain derivative information and the multidimensional fast Fourier transform. It is shown that this technique can be efficiently implemented when a circuit is driven by any number of incommensurate input frequencies. A harmonic balance simulator is constructed which uses this technique to determine the entries of the Jacobian matrix which are needed in a quasi-Newton iteration scheme. A significant reduction of simulation time is observed when compared with a harmonic balance simulator that uses matrix-multiplication-based transforms.

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