Abstracts

Adaptive preconditioners for the simulation of extremely nonlinear circuits using harmonic balance

M.M. Gourary, S.G. Rusakov, S.L. Ulyanov, M.M. Zharov, K.K. Gullapalli and B.J. Mulvaney. "Adaptive preconditioners for the simulation of extremely nonlinear circuits using harmonic balance." 1999 MTT-S International Microwave Symposium Digest 99.2 (1999 Vol. II [MWSYM]): 779-782 vol.2.

Krylov subspace techniques in harmonic balance simulations become increasingly ineffective when applied to strongly nonlinear circuits. This limitation is particularly important in the simulation of the nonlinear aspects of a circuit such as the 1 dB gain compression or if the circuit has components being operated in a very nonlinear region. Even if the circuit contains only a few very nonlinear components, Krylov methods using standard preconditioners can become ineffective. To overcome this problem, we present an adaptive preconditioner that dynamically exploits the properties of the harmonic balance Jacobian. With this technique we have been able to retain the advantages of Krylov methods even for strongly nonlinear circuits. Some numerical experiments illustrating the technique are presented.

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