

Abstracts

Generalized reaction and unrestricted variational formulation of cavity resonators. II. Nonorthogonal and free-boundary mode-matching method

A.M. Shams-Zadeh-Amiri, S. Safavi-Naeini, S.K. Chaudhuri and R. Sabry. "Generalized reaction and unrestricted variational formulation of cavity resonators. II. Nonorthogonal and free-boundary mode-matching method." 2002 Transactions on Microwave Theory and Techniques 50.11 (Nov. 2002 [T-MTT] (Mini-Special Issue on the 2002 IEEE Radio Frequency Integrated Circuit (RFIC) Symposium)): 2491-2498.

For pt. I see *ibid.*, vol. 50, no. 11, p. 2480-90 (2002). This paper addresses a systematic method whereby the conventional mode-matching method is generalized to the cases where the set of modes used for the field expansion within a cavity resonator are relaxed to be orthogonal or satisfy any specific boundary conditions. It is shown that this approach is based on the unrestricted variational formulation of a cavity resonator. Reciprocity theorem and generalized reaction are the mathematical foundations of this new formulation. We have shown that the conventional mode-matching method is a special case of this generalized formulation and indeed is variational in nature. More precisely, we have proven that, if the field distribution obtained based on the conventional mode-matching method is used as a trial one in some variational formulas, the resonant frequency will be the same as the one obtained by the mode-matching method.

[Return to main document.](#)