Abstracts

On the Synthesis of Dual-Resonant Coaxial Cavities

F.M. Waltz. "On the Synthesis of Dual-Resonant Coaxial Cavities." 1964 Transactions on Microwave Theory and Techniques 12.1 (Jan. 1964 [T-MTT]): 132-138.

Mathematical analyses of multisection coaxial cavities predict the possibility of shifting one of the spurious resonant frequencies (present in all coaxial cavities) to a desired frequency, thus allowing one cavity to do the work of two. The specific problem considered in this paper is the design of cavities to resonate a terminating capacitance (e.g., tube capacitance, "varactor" capacitance) at two harmonically-related frequencies, with the additional requirement that the two frequencies remain very nearly in the desired ratio despite wide variations in the magnitude of the terminating capacitance. (As one obvious application, a cavity meeting these requirements would make possible an inherently-aligned single-cavity frequency multiplier.) Curves based on computed results for specific cases are presented. Experimental cavities constructed according to the predicted designs have exhibited performance which is in very close agreement with the analysis, thus verifying both the validity of the method of analysis and the feasibility of the desired result. Application of the same techniques to other and more general problems (e.g., single-cavity mixers, voltage-tunable filters) are suggested.

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