Abstracts

Microwave Q Measurements in the Presence of Coupling Losses

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In the use of the impedance (Q-circle) method of measuring the cavity Q values, the presence of losses in the coupling network (between the cavity and the available external terminals) is usually neglected. If appreciable losses are present this simplification is not justitied, and its use can lead to significant errors. The losses in any coupling network can be described by means of an equivalent canonical circuit containing a series and a shunt resistor. The losses due to the series element are immediately apparent from the character of the impedance locus when plotted on a Smith Chart and can be corrected for an "apparent" Q value. However, unless the shunt loss can be determined by a separate calibration of the coupling network, the apparent Q value will be ambiguous because the shunt losses occurring in the coupling network are not distinguishable from those in the cavity proper. Methods for using the impedance data for determining the Q values are given on the assumption that the coupling network parameters cm be found. It is also pointed out that due to the presence of coupling losses the loaded and external Q values are no longer uniquely defined, but their meaning depends upon the application of interest. Formulas relating these to the coupling network parameters are given.

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