Abstracts

Microwave Automatic Impedance Measuring Schemes Using Three Fixed Probes

C.-L.J. Hu. "Microwave Automatic Impedance Measuring Schemes Using Three Fixed Probes." 1983 Transactions on Microwave Theory and Techniques 31.9 (Sep. 1983, Part I [T-MTT]): 756-762.

Following a previous article reporting a general theory and a new approach using multiple probes to measure the complex impedance of an unknown microwave load, this article describes a simplified, but improved, design derived from that general theory. A simple analog dc signal processor was built according to this design and preliminary experiments were carried out to check the performance of the system. Real time oscilloscope displays showing the complex reflection coefficients of some standard loads and some time-varying loads were recorded. The performance of this system was checked against that of the standard traveling probe technique. The maximum disagreement between the two methods is about 5 percent in amplitude and 7° in phase. A special dc signal processor-the display rotator-was used in the system. The purpose, the design, and the performance of this rotator circuit are discussed in detail. Although the present experiments are restricted to fixed-frequency-automatic measurements, the system is seen to be easily generalized to step-frequency measurements as well. The latter can be used to record automatically the complex impedance spectrum of an unknown microwave load when the frequency is changed. Component imperfections that may affect the system accuracy and comparison of the present system with other automatic measuring systems are discussed.

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