SESSION 17: MIC TECHNIQUES

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The first theme addressed in this session is the miniaturization of microwave components. It is shown, through the use of lumped-elements, that the circuit area of Wilkenson combiners and branch-line couplers is reduced to less than 20% of conventional distributed realizations at 4 GHz. These savings will be important for future small-size, light-weight microwave components realized in either a hybrid or monolithic integrated circuit format. For MMIC's, the reduction of the ratio of passive-to-active circuit area is of importance for yield considerations.

The second presentation deals with the transitioning between waveguide, hybrid, and monolithic circuits. Each circuit medium has recognized strengths, and components of the future must be capable of efficiently launching from one medium to another in a low cost, low loss way. Geller and Zaghloul discuss a K-band waveguide-to-MMIC transition that uses a dielelectric substrate as an intermediate propagation and support medium. The substrate is mounted in a section of rectangular waveguide that also serves the dual role of propagation medium and mechanical housing. The substrate can easily be removed, and its one piece construction allows reproducible and non-invasive measurement of MMIC chips.

The third and major topic of discussion is transitioning and discontinuities in fin-line. It is appropriate that fin-line be highlighted this year since Paul Meier of AIL is being honored with the Microwave Application Award for pioneering development of fin-line and related components using photolithographic techniques. In this session, stepped impedance transformers are presented by Verber, Wolfgang and Hoefer for the transitioning between waveguides and fin-lines. A design procedure for matching sections in the form of a notch or protrusion cut in the fin-line substrate is presented, with accompanying experimental X-band data. Schiebleich and Hinken then will present a design theory for optimum fin-line tapers. Finally, Sorrentino and Itoh discuss the transverse resonance analysis of fin-line discontinuities.

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