Introduction

Microwave Filters: A Maturing Art

SINCE the publication in September 1965 of the first special issue on microwave filters, significant theoretical and technological developments have occurred in this field. Because the major stimulus has been the ever-increasing demand to conserve bandwidth in the congested microwave frequency spectrum, a premium is placed on optimum filter transfer functions that achieve sharp frequency selectivity and flat group delay. In particular, the continued development and expansion of satellite communications systems was the primary driving force behind the development of the dual-mode waveguide bandpass filters. These filters combine both optimum transfer functions with minimum mass and volume, allowing the achievement of significant efficiencies in satellite transponder design. These requirements have also provided an important stimulus for developing new technologies to improve filter construction and manufacturing. In addition, newly developed ceramic materials that combine excellent temperature stability with low dielectric tangents (losses) and high dielectric constants are becoming readily available, thereby further reducing mass, volume, and production cost while maintaining the high-quality performance characteristics of metal cavity filters.

The requirement for higher transmission power from communications satellite earth stations has also led to improved performance of high-power multiplexing. Here again, optimum transmission responses enable contiguous multiplexers to be realized and thereby allow significant reductions in loss, compared to that of noncontiguous designs.

This special issue consists of twelve full and three short papers that present significant advances in the state of the art. Although microwave filters may seem to be a maturing technology, the large number of significant contributions in this issue is clear evidence that this technology is still advancing. Microwave filters are key elements of any microwave communications system, and in the decades ahead, more significant applications and innovations are envisioned.

We are particularly indebted to Seymour Cohn, the guest editor of the first special issue, for an excellent foreword that reviews the contents of the papers. All papers were selected through the standard MTT editorial review procedure, with the final choice and composition determined by the guest editors. We are grateful to numerous reviewers who assisted us in this process. Particular thanks should also be given to Erma Kennedy and Esther Disney, who provided secretarial support and ensured that the review system functioned smoothly.

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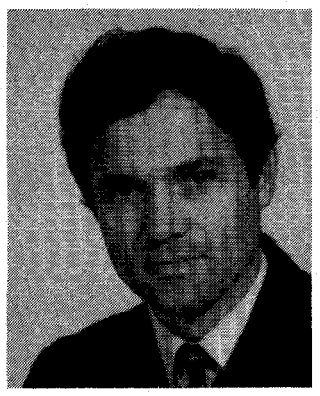

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Dr. Williams was a joint recipient of the Institute of Electrical Engineers (London), Sylvanus P. Thompson Premium award in 1966. He is Chairman of the Microwave Network Theory MTT-8 Technical Subcommittee.

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Dr. Atia was a Senior Scientist in the Microwave Laboratory of COMSAT Laboratories, where he was responsible for research and development of various microwave subsystems and antennas for communications satellites. He has made significant contributions to the developments of microwave filters for use on satellite transponders. He has also contributed to several satellite programs in the areas of communications payload and antenna analysis and design. Additionally, Dr. Atia has been responsible for the implementation of flight hardware on COMSAT's-NASA propagation experiment and COMSTAR's 20/30-GHz Beacon experiment.

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