
Preface

This book is intended to provide a comprehensive coverage of the analysis and applications of coplanar waveguides to microwave circuits and antennas for graduate students in electrical engineering and for practicing engineers.

Coplanar waveguides are a type of planar transmission line used in microwave integrated circuits (MICs) as well as in monolithic microwave integrated circuits (MMICs). The unique feature of this transmission line is that it is uniplanar in construction, which implies that all of the conductors are on the same side of the substrate. This attribute simplifies manufacturing and allows fast and inexpensive characterization using on-wafer techniques.

The first few chapters of the book are devoted to the determination of the propagation parameters of conventional coplanar waveguides and their variants. The remaining chapters are devoted to discontinuities and circuit elements, transitions to other transmission media, directional couplers, hybrids and magic-T, microelectromechanical systems (MEMS) based switches and phase shifters, high- T_c superconducting circuits, tunable devices using ferroelectric materials, photonic bandgap structures, and printed circuit antennas. The author includes several valuable details such as the derivation of the fundamental equations, physical explanations, and numerical examples.

The book is an outgrowth of 15 years of research conducted by the author as a member of the Communications Technology Division (CTD) at the National Aeronautics and Space Administration (NASA), Glenn Research Center (GRC) in Cleveland, Ohio. Over the past few years, interest among engineers in coplanar waveguides has increased tremendously, with some of the concepts being extensively pursued by NASA for future space programs and missions. Numerous articles exist, but there is no collective publication. Thus the decision to publish a book on coplanar waveguides appears to be appropriate.

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