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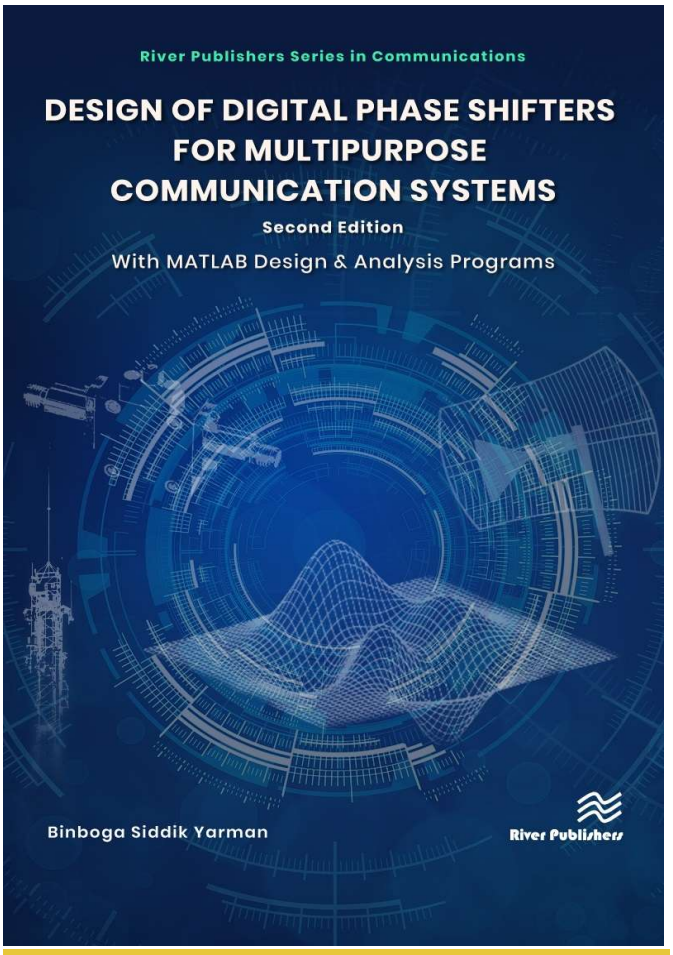
Design of Digital Phase Shifters for Multipurpose Communication Systems

Second Edition with MATLAB Design and Analysis Programs

Author: Binboga Siddik YARMAN, RFT Research Corp., Istanbul, Turkey; Istanbul University-Cerrahpasa, Technical University of Istanbul; University of Lincoln, Lincolnshire UK

This book aims to cover a new emerging need in designing digital phase shifter for modern communication systems. With the advancement of new generation mobile communication systems, directed beams of antenna arrays save a substantial amount of power as well as improve the communication quality. In this regard, beam-forming circuits, such as digital phase shifters (DPS) constitute essential parts of the antenna array systems. Therefore, this book is devoted to the design of digital phase shifters for various communications systems. Nowadays, phase array systems demand compact phase shifters suitable for chip implementation with wide phase-range and broad frequency band. Each chapter of this book is organized as stand-alone in such a way that the reader requires no specific background acquired from the other chapters. For each phase shifter topology introduced in this book, the reader is furnished with explicit design equations to construct the circuit under consideration. Furthermore, design equations are programmed using MATLAB to assess the electrical performance of the phase shifters with ideal and lossy components. MATLAB design programs are given at the and of each chapter as appendices and provided as soft copy on the web page of the book. In chapters 12 and 14, MMIC layouts for the lattice and T-section based DPS are provided for the readers. It is hoped that an interested reader can immediately identifies the "optimum phase shifter topology" for the need under consideration with its estimated electric performance.



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