1. Record Nr. UNINA9910819898803321 Autore Yarman Binboga Siddik Titolo Design of digital phase shifters for multipurpose communication systems with MATLAB design and analysis programs // Binboga Siddik Gistrup, Denmark;; London;; New York, New York:,: River Pubbl/distr/stampa Publishers:,:Routledge,,[2022] ©2022 **ISBN** 1-000-79741-4 1-00-333786-4 1-003-33786-4 1-000-79425-3 87-7022-380-7 Edizione [Second edition.] Descrizione fisica 1 online resource (654 pages) Collana River Publishers series in communications series 621.382 Disciplina Soggetti Digital communications Mobile communication systems Phase shifters Lingua di pubblicazione Inglese Materiale a stampa **Formato** Livello bibliografico Monografia Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Front Cover -- Title - Design of Digital Phase Shifters for Multipurpose Communication Systems With MATLAB Design and Analysis Programs -- Contents -- Preface -- Readers of the Book -- Acknowledgement --List of Figures -- List of Tables -- List of Abbreviations -- 1 Fundamentals of Digital Phase Shifters -- 1.1 Introduction -- 1.2 Concept of Digital Phase Shift -- 1.3 Digital Phase Bits -- 1.4 n-Bit Phase shifter -- 1.5 Phase Error -- 1.6 Practical Issues -- 1.7 Types of Digital Phase Shifters -- References -- 2 Antennas, Arrays, Beam Forming, and Beam Steering -- 2.1 Antenna and Its Definitions -- 2.2 Phased Arrays and Electronic Beam Forming -- 2.3 Electronic Beam Steering -- 2.4 MATLAB-Based ARRAY Package -- 2.5 Conclusion --Appendix -- References -- 3 Scattering Parameters for Lossless Two-Ports -- 3.1 Introduction -- 3.2 Formal Definition of Scattering Parameters -- 3.3 Generation of Scattering Parameters for Linear TwoPorts -- 3.4 Transducer Power Gain in Forward and Backward Directions -- 3.5 Properties of the Scattering Parameters of Lossless Two-Ports -- 3.6 Blashke Products or All-Pass Functions -- 3.7 Possible Zeros of a Proper Polynomial f (p) -- 3.8 Transmission Zeros -- 3.9 Lossless Ladders -- 3.10 Further Properties of the Scattering Parameters of the Lossless Two-Ports -- 3.11 Transfer Scattering Parameters -- 3.12 Cascaded (or Tandem) Connections of Two-Ports -- 3.13 Construction of an n-Bit Phase Shifter by Cascading Phase-Shifting Cells -- 4 Transmission Lines as Phase Shifter -- 4.1 Ideal Transmission Lines -- 4.2 Time Domain Solutions of Voltage and Current Wave Equations -- 4.3 Model for a Two-Pair Wire Transmission Line as an Ideal TEM Line -- 4.4 Model for a Coaxial Cable as an Ideal TEM Line -- 4.5 Field Solutions for TEM Lines -- 4.6 Phasor Solutions for Ideal TEM Lines.

4.7 Steady-State Time Domain Solutions for Voltage -- 4.8 Definition of the Major Parameters of a Transmission Line -- 4.9 Voltage and Current Expression in Terms of Incident and Reflected Waves -- 4.10 TEM Lines as Circuit or "Distributed" Elements -- 4.11 Voltage and Current Expressions at the Load-End -- 4.12 Voltage and Current Expressions at the Source-End -- Input Reflection Coefficient on the z = L Plane -- 4.13 Output Reflection Coefficient at z = 0 Plane -- 4.14 Voltage Standing Wave Ratio: VSWR -- 4.15 Open Expressions for the Input and the Output Reflection -- 4.16 An Open-End TEM Line as a Capacitor -- 4.17 A Shorted TEM Line as an Inductor -- 4.18 A Quarter Wavelength TEM Line at Resonance Frequency -- 4.19 Open-Ended TEM Line with Arbitrary Length -- 4.20 Shorted TEM Line with Arbitrary Length -- 4.21 Ideal TEM Lines with No Reflection: Perfectly Matched and Mismatched Lines -- 4.22 Conclusion -- Appendix -- References -- 5 Loaded-Line Digital Phase Shifters -- 5.1 Loaded-Line Phase Shifters with Single Reactive Elements -- 5.2 Inductively Series Loaded-Line Digital Phase Shifter -- 5.3 Series Loaded-Line Digital Phase Shifter -- 5.4 Parallel Load Line Digital Phase Shifters with Transformer -- 5.5 A Perfectly Matched PLL-DPS Loaded with Tuned Circuits -- 5.6 Perfectly Matched PLL-DPS with Effective Inductor "L" -- 5.7 Reflection Phase Shifters -- Appendix -- References -- 6 Symmetric T-/PI-Sections as Phase Shifters -- 6.1 Scattering Parameters of a Symmetric T-Section -- 6.2 A Low-pass Symmetric T-Section -- Appendix --References -- 7 180 Low-pass-Based T-Section Digital Phase Shifter Topology (LPT-DPS) -- 7.1 Solid-State Microwave Switches -- 7.2 Lowpass-Based Symmetric T-Section Digital Phase Shifter -- 7.3 Concept of Digital Phase Shift and Design Algorithm -- 7.4 Algorithm to Design LPT-DPS for the Phase Range 180 &lt.

= A &lt -- 0 -- 7.5 Effect of Circuit Component Losses on the Electric -- 7.6 Algorithm to Compute Component Lossless of LPT-DPS -- 7.7 General Comments and Conclusion -- Appendix -- References -- 8 180 Low-pass-Based PI-Section Digital Phase Shifter Topology (LPI-DPS) -- 8.1 Low-pass-Based Symmetric PI-Section Digital Phase Shifter -- 8.2 Algorithm to Design a Low-pass-Based PI-Section Digital Phase Shifter -- 8.3 Algorithm to Design LPI-DPS for the Phase Range 180 &lt -- = A &lt -- 0 -- 8.4 Algorithm to Compute Component Lossless of LPI-DPS -- 8.5 General Comments and Conclusion -- Appendix --References -- 9 180 High-pass-Based T-Section Digital Phase Shifter Topology (HPT-DPS) -- 9.1 High-pass-Based Symmetric T-Section Digital Phase Shifter -- 9.2 Concept of Digital Phase Shift and Design Algorithm -- 9.3 Algorithm to Design HPT-DPS for the Phase Range 180 &lt -- = A &lt -- 0 -- 9.4 Effect of Circuit Component Losses on the Electric -- 9.5 Algorithm: Design of a Lossy HPT-DPS -- 9.6 General Comments and Conclusion -- Appendix -- References -- 10 A

Symmetric Lattice-Based Wideband Wide Phase Range Digital Phase Shifter Topology -- 10.1 Introduction -- 10.2 Properties of Lossless Symmetric Lattice Structures -- 10.3 A Lossless Symmetric Lattice Utilized as a Phase Shifter -- 10.4 Lagging LSLS -- 10.5 Leading LSLS -- 10.6 Switching Between the Lattice Topologies -- 10.7 Basic Algorithm to Design Ideal 3S-DPS Section at 0 = 1 - 10.8 Operation of 3S-DPS Topology -- 10.9 Practical Design Algorithm: Estimation of the Normalized Element Values -- 10.10 Analysis of the Phase Shifting Performance of 3S-DPS -- 10.11 Performance Measure of Digital Phase Shifters -- 10.12 Investigation of Unequal Phase Distributions Between the States -- 10.13 Practical Lossy Design of A 3D-DPS -- 10.14 Investigation of Unequal Phase Distribution Between the States. 10.15 ON-Chip Inductor Design -- 10.16 Implementation and Performance Results of A Simple and Single -- Appendix -- References -- 11 360 T-Section Digital Phase Shifter -- 11.1 Derivation of Design Equations for a 360 T-Section -- 11.2 Algorithm to Design 360 T-Section Digital Phase Shifter -- 11.3 Unequal Distribution of the Phase Shift Between the States -- 11.4 Analysis of the Phase Performance of the 360 s T-Section -- 11.5 Algorithm: Design of a Lossy 360 T-Section DPS -- 11.6 Physical Implementation of 360 T-DPS --Appendix -- References -- 12 360 PI-Section Digital Phase Shifter --12.1 Derivation of Design Equations for a 360 PI-Section -- 12.2 Algorithm to Design 360 PI-Section Digital Phase Shifter -- 12.3 Unequal Distribution of the Phase Shifts Between the States -- 12.4 Analysis of the Phase Performance of the 360 PI-Section -- 12.5 Algorithm: Design of a Lossy 360 PI-Section DPS -- 12.6 Physical Implementation of 360 PI-DPS -- Appendix -- References -- 13 180 High-pass-Based PI-Section Digital Phase Shifter -- 13.1 Derivation of Design Equations for a 180 PI-Section Digital Phase Shifter -- 13.2 Algorithm to Design 180 PI-Section Digital Phase Shifter -- 13.3 Analysis of the Phase Performance of the 360 -- 13.4 Algorithm: Design of a Lossy 180 HPI Section DPS -- 13.5 Physical Implementation of 180 HPI-DPS -- Appendix -- References -- 14 A Wide Phase Range Compact T-Section Digital Phase Shifter Topology -- 14.1 Proposed Compact LC Ladder-Based Phase Shifter -- 14.1.1 Analysis and Design of the Simple and Compact LC Ladder Phase Shifter with Ideal Switches -- 14.1.2 Actual Performance Analysis -- 14.1.3 Practical Design Algorithm: Estimation of the Normalized Element Values of the Proposed Phase Shifter -- 14.2 Schematics Implementation and Performance Results -- 14.3 Conclusion -- References -- Index --About the Author -- Back Cover.