

1. Record Nr.	UNINA9910153205603321
Titolo	Synthesized transmission lines : design, circuit implementation, and phased array applications / / Tzyh-Ghuang Ma, Chao-Wei Wang, Chi-Hui Lai, Ying-Cheng Tseng
Pubbl/distr/stampa	Singapore ; ; Hoboken, NJ : , : John Wiley & Sons, , 2017 [Piscataqay, New Jersey] : , : IEEE Xplore, , [2017]
ISBN	1-118-97573-1 1-118-97574-X
Descrizione fisica	1 online resource (217 pages)
Disciplina	621.3841/35
Soggetti	Microwave transmission lines - Design and construction Phased array antennas - Design and construction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	-- Preface xi -- 1 Introduction to Synthesized Transmission Lines 1 /C. W. Wang and T. G. Ma -- 1.1 Introduction 1 -- 1.2 Propagation Characteristics of a TEM Transmission Line 2 -- 1.2.1 Wave Equations 2 -- 1.2.2 Keys to Miniaturization 5 -- 1.3 Analysis of Synthesized Transmission Lines 7 -- 1.3.1 Bloch Theorem and Characterization of a Periodic Synthesized Transmission Line 7 -- 1.3.2 Characterization of a Non?-Periodic Synthesized Transmission Line 9 -- 1.3.3 Extraction of Line Parameters from S?-Parameters 10 -- 1.4 Lumped and Quasi?-Lumped Approaches 11 -- 1.4.1 Lumped Networks 11 -- 1.4.2 Shunt?-Stub Loaded Lines 14 -- 1.5 One?-Dimensional Periodic Structures 16 -- 1.5.1 Complementary?-Conducting?-Strip Lines 19 -- 1.6 Photonic Bandgap Structures 20 -- 1.7 Left?-Handed Structures 21 -- References 24 -- 2 Non?-Periodic Synthesized Transmission Lines for Circuit Miniaturization 26 /C. W. Wang and T. G. Ma -- 2.1 Introduction 26 -- 2.2 Non?-Periodic Synthesized Microstrip Lines and Their Applications 27 -- 2.2.1 Design Details and Propagation Characteristics 27 -- 2.2.2 90A and 180A Hybrid Couplers 30 -- 2.2.3 Application to Butler Matrix as Array Feeding Network 32 -- 2.3 Non?-Periodic Synthesized Coplanar Waveguides and Their Applications 34 -- 2.3.1

Synthesis and Design 34 -- 2.3.2 180A Hybrid Using Synthesized CPWs 37 -- 2.3.3 Dual?-Mode Ring Bandpass Filters 38 -- 2.4 Non?-Periodic Quasi?-Lumped Synthesized Coupled Lines 42 -- 2.4.1 Basics of Coupled Transmission Lines 42 -- 2.4.2 Miniaturization of Coupled Lines and the Directional Couplers 44 -- 2.4.3 Marchand Baluns Using Synthesized Coupled Lines 49 -- 2.4.4 Lumped Directional Coupler and the Phase Shifter 53 -- 2.5 Non?-Periodic Synthesized Lines Using Vertical Inductors 55 -- References 60 -- 3 Dual/Tri?-Operational Mode Synthesized Transmission Lines: Design and Analysis 62 /C. H. Lai and T. G. Ma -- 3.1 Introduction 62 -- 3.2 Equivalent Circuit Models and Analysis 63 -- 3.2.1 Ladder?-Type Approximation in the Passband 63.
3.2.2 Half?-Circuit Model at Resonance 64 -- 3.3 Dual?-Operational Mode Synthesized Transmission Lines 65 -- 3.3.1 Design Concept 65 -- 3.3.2 Dual?-Mode Synthesized Line Using a Series Resonator 66 -- 3.3.3 Dual?-Mode Synthesized Line Using Open-Circuited Stubs 70 -- 3.3.4 Dual?-Mode Synthesized Line Using Parallel Resonators 72 -- 3.4 Tri?-Operational Mode Synthesized Lines Using Series Resonators 74 -- 3.4.1 Design Concept 74 -- 3.4.2 Tri?-Mode Synthesized Line as Category?-1 Design 75 -- 3.4.3 Tri?-Mode Synthesized Line as Category?-2 Design 79 -- 3.4.4 Tri?-Mode Synthesized Line as Category?-3 Design 83 -- 3.5 Multi?-Operational Mode Synthesized Lines as Diplexer and Triplexer 87 -- 3.5.1 Diplexer 87 -- 3.5.2 Triplexer 89 -- References 94 -- 4 Applications to Heterogeneous Integrated Phased Arrays 95 /C. H. Lai and T. G. Ma -- 4.1 Introduction 95 -- 4.2 Dual?-Mode Retrodirective Array 96 -- 4.2.1 Design Goal 96 -- 4.2.2 System Architecture 97 -- 4.2.3 Circuit Realization 98 -- 4.2.4 Bistatic Radiation Patterns 102 -- 4.2.5 Alternative Architecture 103 -- 4.3 Dual?-Mode Integrated Beam?-Switching/Retrodirective Array 106 -- 4.3.1 Design Goal 106 -- 4.3.2 System Architecture 106 -- 4.3.3 Circuit Realization 109 -- 4.3.4 Radiation Characteristics 111 -- 4.3.5 Complementary Design 111 -- 4.4 Tri?-Mode Heterogeneous Integrated Phased Array 115 -- 4.4.1 Design Goal 115 -- 4.4.2 System Architecture 116 -- 4.4.3 Operation and System Implementation 117 -- 4.4.4 Circuit Responses and Radiation Patterns 119 -- 4.4.4.1 Beam?-Switching Mode 120 -- 4.4.4.2 Van Atta Mode 122 -- 4.4.4.3 PCA Mode 122 -- 4.5 Simplified Dual?-Mode Integrated Array Using Two Elements 122 -- References 124 -- 5 On?-Chip Realization of Synthesized Transmission Lines Using IPD Processes 126 /Y. C. Tseng and T. G. Ma -- 5.1 Introduction 126 -- 5.2 Integrated Passive Device (IPD) Process 127 -- 5.3 Tight Couplers Using Synthesized CPWs 128 -- 5.3.1 Quadrature Hybrid 128 -- 5.3.2 Wideband Rat?-Race Coupler 129.
5.3.3 Dual?-Band Rat?-Race Coupler 132 -- 5.3.4 Coupled?-Line Coupler 137 -- 5.3.5 Butler Matrix 139 -- 5.4 Bandpass/Bandstop Filters Using Synthesized CPWs 142 -- 5.4.1 Bandpass Filter Using Synthesized Stepped?-Impedance Resonators 143 -- 5.4.2 Transformer?-Coupled Bandpass Filter 146 -- 5.4.3 Bridged T?-Coils as Common?-Mode Filter 147 -- 5.5 Chip Designs Using Multi?-Mode Synthesized CPWs 151 -- 5.5.1 Diplexer 151 -- 5.5.2 Dual?-Mode Rat?-Race Coupler 154 -- 5.5.3 Triplexer 157 -- 5.5.4 On?-Chip Liquid Detector 161 -- References 166 -- 6 Periodic Synthesized Transmission Lines with Two?-Dimensional Routing 168 /T. G. Ma -- 6.1 Introduction 168 -- 6.2 Design of the Unit Cells 169 -- 6.2.1 Formulation 169 -- 6.2.2 Quarter?-Wavelength Lines 172 -- 6.3 Power Divider and Couplers 174 -- 6.4 Broadside Directional Coupler 178 -- 6.4.1 Design Principle 178 -- 6.4.2 Circuit Realization 180 -- 6.5 Common?-Mode Rejection Filter 184 -- 6.5.1 Design Principle 184 --

6.5.2 Circuit Realization 187 -- 6.6 On-Chip Implementation 189 --
6.6.1 Unit Cells and Quarter-Wavelength Lines 189 -- 6.6.2 Circuit
Implementations and Compensation 192 -- References 194 -- Index
196.
