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3.2.5 Bode Plots of Type 3 PLLs; 3.3 Nyquist Diagrams; 3.4 Nichols Charts; 3.4.1 Stability Criterion; 3.4.2 M-Contours; 3.4.3 Examples of Nichols Charts; 3.5 Closed-Loop Frequency-Response Curves; Appendix 3A: Salient Features of Root Loci; 3A.1 Branches of Root Loci; 3A.2 Locus on the Real Axis; 3A.3 Locus Intersections with Axes; Appendix 3B: Formats of the Open-Loop Transfer Function $G(s)$; 3B.1 Proportional-Plus-Integral Section; 3B.2 High-Frequency Section; 3B.3 Calculations; Appendix 3C: Closed-Loop Frequency Responses; 3C.1 Frequency-Response Formulas; 3C.2 Example Frequency-Response Graphs; References; 4 DIGITAL PLLS: TRANSFER FUNCTIONS AND RELATED TOOLS; 4.1 Distinctive Properties of Digital PLLs; 4.2 Digital Transfer Function; 4.2.1 Configuration of a Digital PLL; 4.2.2 Difference Equations; 4.2.3 z-Transforms of the Loop Elements; 4.2.4 Loop Filter; 4.2.5 Loop Transfer Functions; 4.2.6 Poles and Zeros; 4.3 Loop Stability; 4.3.1 Type 1 DPLLs; 4.3.2 Type 2 DPLLs; 4.3.3 Type 3 DPLLs; 4.4 Root-Locus Plots; 4.4.1 Root Loci of Type 1 DPLLs; 4.4.2 Root Loci of Type 2 DPLLs; 4.4.3 Root Loci of Type 3 DPLLs; 4.5 DPLL Frequency Responses: Formulation; 4.6 Bode Plots and Nichols Charts; 4.6.1 Basis of Bode Plots; 4.6.2 Bode Stability Criteria; 4.6.3 Bode Plots of Example DPLLs; 4.6.4 Nichols Chart Example; 4.7 Time-Continuous Approximation for a DPLL; 4.8 Frequency-Response Examples; 4.8.1 Effect of Delay; 4.8.2 Effect of Bandwidth; 4.9 Lowpass Filters in the Loop; 4.9.1 Infinite Impulse Response Lowpass Filter; 4.9.2 Finite Impulse Response Lowpass Filter; Appendix 4A: Stability of Digital Phaselock Loops; 4A.1 Type 1 DPLL; 4A.2 Type 2 DPLL; Reference; 5 TRACKING; 5.1 Linear Tracking; 5.1.1 Steady-State Phase Errors

Sommario/riassunto

A greatly revised and expanded account of phaselock technology. The Third Edition of this landmark book presents new developments in the field of phaselock loops, some of which have never been published until now. Established concepts are reviewed critically and recommendations are offered for improved formulations. The work reflects the author's own research and many years of hands-on experience with phaselock loops. Reflecting the myriad of phaselock loops that are now found in electronic devices such as televisions, computers, radios, and cell phones, the book offers readers mu