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7.5 Common terminology -- 7.6 Drawbacks of differential signaling -- 7.7 References -- 7.8 Problems -- Chapter 8: Mathematical Requirements of Physical Channels -- 8.1 Frequency domain effects in time domain simulations -- 8.2 Requirements for a physical Channel -- 8.3 References -- 8.4 Problems -- Chapter 9: Network Analysis for Digital Engineers -- 9.1 High frequency voltage and current waves -- 9.2 Network Theory -- 9.3 Properties of Physical S-parameters -- 9.4 References -- 9.5 Problems -- Chapter 10: Topics in High-Speed Channel Modeling -- 10.1 Creating a physical transmission line mode -- 10.2 Non-Ideal Return Paths -- 10.3 Vias -- 10.4 References -- 10.5 Problems -- Chapter 11: I/O Circuits and Models -- 11.1 Introduction -- 11.2 Push-Pull Transmitters -- 11.3 CMOS Receivers -- 11.4 ESD Protection Circuits -- 11.5 On-Chip Termination -- 11.6 Bergeron Diagrams -- 11.7 Open Drain Transmitters -- 11.8 Differential Current Mode Transmitters -- 11.9 Low Swing/Differential Receivers -- 11.10 IBIS Models -- 11.11 Summary -- 11.12 References -- 11.13 Problems -- Chapter 12: Equalization -- 12.1 Introduction -- 12.2 Continuous Time Linear Equalizers -- 12.3 Discrete Linear Equalizers -- 12.4 Decision Feedback Equalization -- 12.5 Summary -- 12.6 References -- 12.7 Problems -- Chapter 13: Modeling and Budgeting of Timing Jitter and Noise -- 13.1 The Eye Diagram -- 13.2 Bit Error Rate -- 13.3 Jitter Sources and Budgets -- 13.4 Noise Sources and Budgets -- 13.5 Peak Distortion Analysis Methods -- 13.6 Summary -- 13.7 References -- 13.8 Problems -- Chapter 14: System Analysis Using Response Surface Modeling -- 14.1 Introduction -- 14.2 Case Study: 10 Gb/s differential PCB interface -- 14.3 RSM Construction by Least Squares Fitting -- 14.4 Measures of Fit -- 14.5 Significance Testing -- 14.6 Confidence Intervals -- 14.7 Sensitivity

Analysis and Design Optimization -- 14.8 Defect Rate Prediction Using Monte Carlo Simulation -- 14.9 Additional RSM Considerations -- 14.10 Summary.
14.11 References -- 14.12 Problems -- Appendix A: Useful formulae, identities, units and constants -- Appendix B: 4-port Conversions between T and S-parameters -- Appendix C: Critical values of the F-statistic -- Appendix D: Critical values of the t-statistic -- Appendix E: Derivation of the internal inductance using the Hilbert Transform.

Sommario/riassunto

A synergistic approach to signal integrity for high-speed digital design This book is designed to provide contemporary readers with an understanding of the emerging high-speed signal integrity issues that are creating roadblocks in digital design. Written by the foremost experts on the subject, it leverages concepts and techniques from non-related fields such as applied physics and microwave engineering and applies them to high-speed digital design--creating the optimal combination between theory and practical applications. Following an introduction to the importance of signal integrity, chapter coverage includes: . Electromagnetic fundamentals for signal integrity. Transmission line fundamentals. Crosstalk. Non-ideal conductor models, including surface roughness and frequency-dependent inductance. Frequency-dependent properties of dielectrics. Differential signaling. Mathematical requirements of physical channels. S-parameters for digital engineers. Non-ideal return paths and via resonance. I/O circuits and models. Equalization. Modeling and budgeting of timing jitter and noise. System analysis using response surface modeling Each chapter includes many figures and numerous examples to help readers relate the concepts to everyday design and concludes with problems for readers to test their understanding of the material. Advanced Signal Integrity for High-Speed Digital Designs is suitable as a textbook for graduate-level courses on signal integrity, for programs taught in industry for professional engineers, and as a reference for the high-speed digital designer.