



The Designer's Guide to High-Purity Oscillators (The Designer's Guide Book Series)

By Emad Eldin Hegazi, Jacob Rael, Asad Abidi

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try to predict it using mathematical expressions. His heuristic model without mathematical proof is almost universally accepted. However, it entails a circuit specific noise factor that is not known a priori and so is not predictive. In this work, we attempt to address the topic of oscillator design from a different perspective. By introducing a new paradigm that accurately captures the subtleties of phase noise we try to answer the question: 'why do oscillators behave in a particular way?' and 'what can be done to build an optimum design?' It is also hoped that the paradigm is useful in other areas of circuit design such as frequency synthesis and clock recovery. In Chapter 1, a general introduction and motivation to the subject is presented. Chapter 2 summarizes the fundamentals of phase noise and timing jitter and discusses earlier works on oscillator's phase noise analysis. Chapter 3 and Chapter 4 analyze the physical mechanisms behind phase noise generation in current-biased and Colpitts oscillators. Chapter 5 discusses design trade-offs and new techniques in LC oscillator design that allows optimal design. Chapter 6 and Chapter 7 discuss a topic that is typically ignored in oscillator design. That is flicker noise in LC oscillators. Finally, Chapter 8 is dedicated to the complete analysis of the role of varactors both in tuning and AM-FM noise conversion.

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Editorial Review

From the Back Cover

The Designer's Guide to High-Purity Oscillators presents a comprehensive theory and design methodology for the design of LC CMOS oscillators used in every wireless transmission system. The authors introduce the subject of phase noise and oscillators from the very first principles, and carry the reader to a very intuitive circuit-driven theory of phase noise in LC oscillators. The presented theory includes both thermal and flicker noise effects. Based on Hegazi, Rael, and Abidi's mechanistic theory, a sensible design methodology is gradually developed. In addition, new topologies that were recently published by the authors are discussed in detail and an optimal design methodology is presented. While the book focuses on intuition, it rigorously proves every argument to present a compact yet accurate model for predicting phase noise in LC oscillators. By so doing, the design of an LC oscillator can be handled in the same manner as an amplifier design.

Users Review

From reader reviews:

Trevor Wright:

The publication untitled The Designer's Guide to High-Purity Oscillators (The Designer's Guide Book Series) is the book that recommended to you to learn. You can see the quality of the reserve content that will be shown to an individual. The language that article author use to explained their ideas are easily to understand. The article writer was did a lot of investigation when write the book, and so the information that they share for your requirements is absolutely accurate. You also can get the e-book of The Designer's Guide to High-Purity Oscillators (The Designer's Guide Book Series) from the publisher to make you a lot more enjoy free time.

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Effie Peoples:

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Donald White:

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