



## Phase Noise and Frequency Stability in Oscillators (The Cambridge RF and Microwave Engineering Series)

By Enrico Rubiola

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### Phase Noise and Frequency Stability in Oscillators (The Cambridge RF and Microwave Engineering Series) By Enrico Rubiola

Presenting a comprehensive account of oscillator phase noise and frequency stability, this practical text is both mathematically rigorous and accessible. An in-depth treatment of the noise mechanism is given, describing the oscillator as a physical system, and showing that simple general laws govern the stability of a large variety of oscillators differing in technology and frequency range. Inevitably, special attention is given to amplifiers, resonators, delay lines, feedback, and flicker ( $1/f$ ) noise. The reverse engineering of oscillators based on phase-noise spectra is also covered, and end-of-chapter exercises are given. Uniquely, numerous practical examples are presented, including case studies taken from laboratory prototypes and commercial oscillators, which allow the oscillator internal design to be understood by analyzing its phase-noise spectrum. Based on tutorials given by the author at the Jet Propulsion Laboratory, international IEEE meetings, and in industry, this is a useful reference for academic researchers, industry practitioners, and graduate students in RF engineering and communications engineering.

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### **Editorial Review**

#### About the Author

Enrico Rubiola is a Senior Scientist at the CNRS FEMTO-ST Institute and a Professor at the Universite de Franche Comte. With previous positions as a Professor at the Universite Henri Poincare, Nancy, and in Italy at the University Parma and the Politecnico di Torino, he has also consulted at the NASA/Caltech Jet Propulsion Laboratory. His research interests include low-noise oscillators, phase/frequency noise metrology, frequency synthesis, atomic frequency standards, radio-navigation systems, precision electronics from dc to microwaves, optics and gravitation.

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