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| Nota di contenuto | Chapter 1. Introduction -- Chapter 2. Nanostructural Optoelectronic Oscillators with the Fiber-Optical Delay Line -- Chapter 3. Modulation Methods of Laser Emission in Optoelectronic oscillator (OEO) and OEO Differential Equations -- Chapter 4. Semiclassical Theory and Laser Differential Equations for Optoelectronic oscillator (OEO) Analysis. -- Chapter 5. Optoelectronic oscillator (OEO) Differential Equations as the Laser System with Modulation and Positive Feedback -- Chapter 6. Operation Analysis of Optoelectronic oscillator (OEO) with External Mach-Zehnder Modulator. -- Chapter 7. Optoelectronic oscillator (OEO) as the Time and Spatial Correlator of Random Variables with Differential Delay Line -- Chapter 8. Experimental Investigations and Practical Circuits of Optoelectronic oscillator (OEO) with RF FODL. |
| Sommario/riassunto | This book is devoted to the theoretical and experimental investigation of the optoelectronic oscillator (OEO) with direct and external modulation of laser emission. Such devices, sources of precision radio frequency oscillations using laser excitation, are novel and technologically relevant, with manifold possible applications. It includes a review of the present state of the theory and generation techniques in microwave and mm-wave ranges for traditional and optoelectronic oscillators, description of OEO construction and operation principles, theoretical oscillation analysis and mathematical description of the relevant semi-classical laser physics, and investigation of the power |

spectral density of noises. Technical features and advantages of OEOs with external and direct modulation of laser emission are discussed together with functional diagrams. The characteristics of OEOs are compared with other traditional RF oscillators, such as quartz, surface acoustic waves, and oscillators with electromagnetic wave cavities. Special attention is paid to Q-factors and phase noises of RF carriers at small offsets. The authors discuss the technical characteristics of modern optoelectronic methods for precision RF oscillation formation, such as commercial large-dimension and compact quantum frequency standards with optical pumping on cesium and rubidium cells. This book is aimed at scientists and engineers in academia and industry who work with sources of microwave and mm-wave signals.
