



# RF Circuit Design: Theory and Applications

*Reinhold Ludwig, Pavel Bretchko*

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## **RF Circuit Design: Theory and Applications** Reinhold Ludwig, Pavel Bretchko

For upper-level Electrical Engineering introductory courses in RF Circuit Design and analog integrated circuits. This practical and comprehensive book introduces RF circuit design fundamentals with an emphasis on design methodologies. \*Provides MATLAB routines to carry out simple transmission line computations and allow the graphical display of the resulting impedance behaviors as part of the Smith Chart. \*Allows students to implement these software tools on their own PC. \*All m-files will be included on a bound in CD-ROM. \*Presents RF Amplifier Designs, including small and large signal designs, narrow versus broad band, low noise, and many others. \*Provides students with useful broad-based knowledge of common amplifier designs used in the industry. \*Discusses Matching Networks, such as T and P matching networks and single and double stub matching. It also includes Discrete and Microstrip Line matching techniques with computer simulations... \*Presents Scattering parameters such as realistic listings of S-parameters for transistors and transmission line. \*Highlights practical use of S-parameters in circuit design and performance evaluation. \*Features Smith Chart, including series and parallel connections of resistor, capacitor, and inductor networks. It also includes simulations in MATLAB to provide graphical display of circuit behavior and performance analysis. \*Introduces the Smith Chart as a design tool to monitor electric behavior of circuits. \*Introduces the generic forms of Oscillators and Mixers, including negative resistance condition, fixed-frequency, and YIG-tuned designs. \*Explains the most common oscillator designs used in many RF systems. \*Provides an overview of common filter types, including low, high, bandpass, Butterworth, and Chebyshev filters. \*Provides design tools to enable students to develop a host of practically realizable filters. \*Discusses the high-frequency behavior of common circuit components, including the behavior of resistors, capacitors, and inductors. \*Helps students understand the difference of low versus high frequency responses. \*Introduces the theory of distributed parameters through a discussion on Transmission Lines. This includes line parameters, sources and load terminations, and voltage and current waves. \*Outlines the need of distributed circuit theory in today's high frequency circuits. \*Analyzes active/passive RF circuits through various network description models, especially the two-port network. This discussion also covers impedance, admittance, ABCD, h-parameter networks, and interrelations. \*Includes a number of important pedagogical features-Intersperses examples throughout each chapter, and includes self-written MATLAB routines and circuit simulations by a commercial RF software package. \*Assists students by clarifying and explaining the theoretical developments.

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