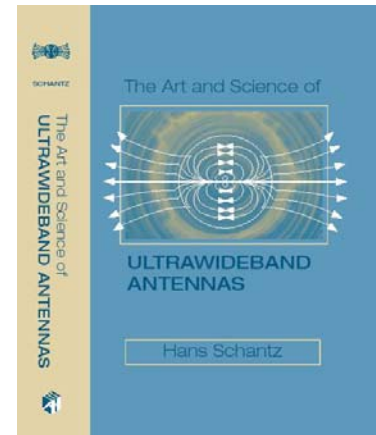


Workshop: The Art and Science of UWB Antennas

Dr. Hans Schantz

The imminent wide scale commercial deployment of ultra-wideband (UWB) systems has led to increased interest in UWB antenna design. The requirements imposed by UWB systems place stringent demands on UWB antennas. For instance, the spectral and impedance matching properties of a UWB antenna exert a profound influence on an overall UWB system design. A well-designed UWB antenna can contribute to system performance by notching out undesired frequencies and controlling roll-off at the end of the operating bands. Thus UWB practice requires a holistic approach to system and antenna design. Based on the author's 2005 text, this workshop is available in a full day presenting nearly 500 slides.



Outline

I. Introduction & Overview

- A. Overview
- B. Historical Background
- C. What is an Antenna?

II. Basic Concepts:

Antennas as Transducers

- A. Bandwidth
- B. Dispersion
- C. Where Energy Goes?
- D. Polarization
- E. Basics of Matching

III. Impedance & Matching:

Antennas as Transformers

- A. Antenna Impedance
- B. Transmission Lines
- C. Matching
- D. Impedance Transformers
- E. Balun Transformers
- F. Antennas as Transformers

IV. Time Domain Electromagnetics:

Antennas as Radiators

- A. Time vs. Frequency Domain
- B. Maxwell's Equations
- C. Linear Antennas
- D. Dipole Fields
- E. Antennas as Radiators

V. Time Domain Energy Flow:

Antennas as Energy Conversion Devices

- A. Motivation
- B. Localizing EM Energy

- C. Optimizing Antenna Elements
- D. Antennas: Energy Converters

VI. Antenna Taxonomy

- A. Frequency Independent
- B. Small Elements (Electric)
- C. Small Elements (Magnetic)
- D. Electrically Small Antennas
- E. UWB Antenna Arrays
- F. Horn Antennas
- G. Reflector Antennas

VII. System & Network Considerations

- A. Spectral Control and Shaping
- B. UWB Antenna Efficiency
- C. Directivity & UWB Links

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