

Design and Assessment of EW Systems

Course description

This one-day course (4 x 1.5hr sessions) provides an introduction to the design and evaluation of modern microwave EW systems.

A novel graphically based set of EW-specific Java applet models has been developed for not only optimising and calculating accurate EW design parameters, but also, serving as valuable interactive learning aids.

The course topics cover the most important technical hurdles likely to be met in the EW system design field. The applets are configured to enable testing of the corner limits of each design topic and provide output design data suitable for equipment specification.

Who should attend

Designers of EW systems and sub-systems and those requiring a deeper understanding of how various microwave technologies and EW architectures operate.

Some familiarity with EW fundamentals, statistics and the Fourier transform is assumed as background knowledge for the course.

If possible, students should have access to a computer. A good class size is 20.

Course outline

The course is based on the instructor's interactive book, 'Microwave System Design Tools and EW Applications, Second Edition', published by Artech House in January 2008.

Introduction to EW System Design

RF Basics

- RF Chain Components and Noise Figure

- VSWR of Cascaded Mismatches

- Mixer Intermodulation Components

- Amplifier Dynamic Range – 1dB Compression and 3rd Order limits

Demodulation and Signal Detection

- Demodulators:

 - Square-Law Detector

 - Quadrature Demodulator

 - Linear Vector Demodulator

- Signal Detection Probability, False Alarms

- Pulse Detection and Measurement

Microwave Receivers

- RF Amplifier Detector-Video Receiver

- Heterodyne and Zero-IF Receiver - Pulse Filtering Distortion

- Digital Fourier Transform Receiver

EW Measurement Systems

- IFM, Linear and Circular Interferometer Design - deambiguity analysis

- Amplitude Comparison DF Systems – algorithm comparison

Operational Performance

- Microwave Signal Propagation, Range Advantage

- Multipath, Reflections and ESM Clutter - ESM performance issues.

Materials

A CDROM is provided for each student, containing course notes and topic applets.

Requirements

Lecture room, Projector and screen, Whiteboard, Refreshments.

Instructor

Peter W. East