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Communication Systems Modeling with Simulink



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Communication Systems Modeling with Simulink

This one-day course demonstrates the use of Simulink products (Simulink, Communications Toolbox, and DSP System Toolbox) to design common communication systems. Topics include: building an AM system and an end-to-end QPSK model, analyzing the bit error rate (BER) of a communication system, adding channel impairments, designing receiver algorithms.

Prerequisites

MATLAB Fundamentals, Signal Processing with MATLAB, and Signal Processing with Simulink, or working experience with MATLAB, Simulink, and DSP System Toolbox

DURATION	LEVEL
1 Day	Medium
	

TOPICS

Day 1

- Amplitude Modulation Using Simulink
- Modeling Using Communications Toolbox
- Communication Systems Analysis
- Channel Impairments and Receiver Algorithms

Amplitude Modulation Using Simulink

OBJECTIVE: Build an AM system to review basic concepts in Simulink.

- Building a simple AM model in Simulink
- Creating a subsystem
- Visualizing a signal in the time and frequency domains
- Working with MATLAB data
- Simulating the model from the command line

Modeling Using Communications Toolbox

OBJECTIVE: Build an end-to-end QPSK model using Communications Toolbox and become familiar with the different visualization tools within the toolbox.

- Exploring Communications Toolbox
- Creating a QPSK transmitter model
- Generating a random source
- Using frame-based processing
- Visualizing with scatter plots and eye diagrams
- Creating a QPSK receiver model
- Calculating error rate statistics

Communication Systems Analysis

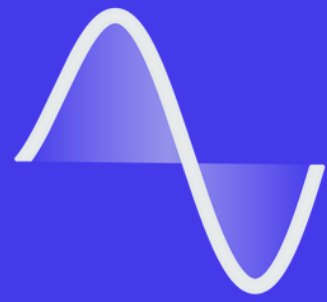
OBJECTIVE: Analyze the BER performance of an end-to-end communication system by writing a MATLAB script and using BERTool.

- Computing the BER curve
- Automating performance analysis: scripts
- Adding channel coding
- Using BERTool for performance analysis

Channel Impairments and Receiver Algorithms

OBJECTIVE: Add channel impairments and recovery blocks to test receiver performance.

- Adding phase and frequency offset
- Correcting phase and frequency using DQPSK
- Adding timing offset
- Correcting for timing offset
- Modeling multi-path channel impairments
- Using MATLAB code in the model for equalization



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