End-to-End Simulation

Integrate subcomponents for link-level BER

Communications Toolbox™ enables you to simulate link-level models of communications systems. Using bit error rate simulations, you can analyze system response to the noise and interference inherent in communication channels, explore what-if scenarios, and evaluate the tradeoffs between competing system architectures and parameters.

The physical layer (PHY) processing chain prepares data received from the higher layers for transmission and recovers transmitted data before passing it to the higher layers. Examples presented in this section demonstrate transmission, impairment of signal by the radio and propagation channel, reception, recovery, and analysis of link performance.

Featured Examples

RF Satellite Link

A satellite link, using the blocks from the Communications Toolbox™ to simulate the following impairments: Memoryless nonlinearity

BER Simulations with Parallel Computing Toolbox

Improve the execution speed of communication systems involving BER simulations. To improve the performance of these systems, one

QPSK Transmitter and Receiver

A digital communications system using QPSK modulation. In particular, this example illustrates methods to address real-world

QPSK Transmitter and Receiver

The implementation of a QPSK transmitter and receiver. The receiver addresses practical issues in wireless communications, e.g.

End-to-End QAM Simulation with RF Impairments and Corrections

Provides visualization capabilities to see the effects of RF impairments and corrections in a satellite downlink. The link employs 16-QAM

Introduction to MIMO Systems

Multiple-Input-Multiple-Output (MIMO) systems, which use multiple antennas at the transmitter and receiver ends of a wireless

DVB-S.2 Link, Including LDPC Coding

The state-of-the-art channel coding scheme used in the second generation Digital Video Broadcasting standard (DVB-S.2),

Estimate BER of 8-PSK in AWGN with Reed-Solomon Coding

Transmit Reed-Solomon encoded data using 8-PSK over an AWGN channel. Demodulate and decode the received signal and collect error

OFDM with MIMO Simulation

Use an OFDM modulator and demodulator in a simple, 2x2 MIMO error rate simulation. The OFDM parameters are based on the

Parallel Concatenated Convolutional Coding: Turbo Codes

The basic structure of turbo codes, both at the transmitter and receiver ends, and characterizes their performance over a noisy channel

Packetized Modem with Data Link Layer

Implement a packetized modem with Data Link Layer [1] using MATLAB® and Communications Toolbox™. The modem features a

ALOHA and CSMA/CA Packetized Wireless Networks

Simulate a basic ALOHA or CSMA/CA MAC using Simulink®, Stateflow® and the Communications Toolbox™.

End to End System Simulation Acceleration Using GPUs

A comparison of four techniques which can be used to accelerate bit error rate (BER) simulations using System objects in the MATLAB®

802.11ac Multi-User MIMO Precoding with WINNER II Channel Model

The transmit and receive processing for a 802.11ac™ multi-user downlink transmission over a WINNER II fading channel. To run this example,