What's new in MATLAB and Simulink for Model-Based Design

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Application Engineer
Model-Based Design Workflow

- **RESEARCH**
- **REQUIREMENTS**

**DESIGN**
- Modeling
  - Scheduling
  - Event modeling
- Performance

**IMPLEMENTATION**
- C, C++
- VHDL, Verilog
- Structured Text
- MCU, DSP, FPGA, ASIC, PLC

**MANAGEMENT AND REPORTING**

**TEST AND VERIFICATION**

INTEGRATION
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TEST AND VERIFICATION

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INTEGRATION
Messages, Functions and Scheduling
New SimEvents
Discrete-event simulation engine for multidomain system models
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Discrete-event simulation engine for multidomain system models
New SimEvents
Discrete-event simulation engine for multidomain system models

How does communication delays effect your system performance?
CAN simulation with Simulink and SimEvents
CAN simulation with Simulink and SimEvents
CAN simulation with Simulink and SimEvents
CAN simulation with Simulink and SimEvents

Effects of Communication Delays on an ABS Control System

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CAN simulation with Simulink and SimEvents

Without background noise

Vehicle stops after 14.2 seconds
CAN simulation with Simulink and SimEvents

Without background noise

Vehicle stops after 14.2 seconds

With background noise

Vehicle stops after 15 seconds
Scheduler Example
Scheduler Example
Scheduler Example
Model-Based Design Workflow

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- **MANAGEMENT AND REPORTING**

- **INTEGRATION**
Fast Restart

Run consecutive simulations more quickly
Fast Restart

Run consecutive simulations more quickly
Fast Restart

Run consecutive simulations more quickly
Simulink - Faster consecutive simulations

Fast Restart
Automatic Solver Selection
Understanding the selected solver

Solver information:
Solver: auto(ode45)
Max step size: 0.01
Understanding the selected solver
Understanding the selected solver - Solver Profiler
Model-Based Design Workflow
Three-Way Model Merge
Chapter 2. Root System

Table of Contents

- Description
- Blocks
- Parameters
- Block Execution Order

Figure 2.1. CruiseControl_harness

Description

The cruise controller was designed with Stateflow. To test the controller, we use a harness with test vectors imported from Excel, and the outputs compared to expected results.
Chapter 2. Root System

Description

The cruise controller was designed with Simulink. To test the controller, we use a harness set, test vectors imported from Excel, and the outputs compared to expected results.

PDF Performance: 15b Versus 16a
Model-Based Design Workflow

- **Research**
- **Requirements**
- **Design**
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    - Event modeling
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- **Implementation**
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  - DSP
  - FPGA
  - ASIC
  - PLC
- **Test and Verification**
- **Management and Reporting**

Technologies:
- MCU
- DSP
- FPGA
- ASIC
- PLC
New Product! Simulink Test

Develop, Manage, and execute simulation-based tests
New Product! Simulink Test

- Automatically generate Test Harness
New Product! Simulink Test

- Automatically generate Test Harness
- Test Sequence block
New Product! Simulink Test

- Automatically generate Test Harness
- Create Test Sequences
- Manage and Reporting
New Product! Simulink Test

- Automatically generate Test Harness
- Create Test Sequences
- Manage and Reporting
Real-Time testing with Simulink Real-Time
Real-Time testing with Simulink Real-Time
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Questions!
Thanks!