What’s New in MATLAB and Simulink

Stephan van Beek
Technical Manager
Applications Engineering Group
MathWorks Benelux
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Imagine making your applications run faster than you ever thought possible!
Imagine stepping **forward** through a simulation
Imagine stepping forward and back through a simulation
Usability
Where is MATLAB and Simulink Today?
Connecting to and Targeting Hardware

**Host Computer**
- MATLAB and Simulink Models
- MATLAB Hardware Support Packages

**Target**
- Simulink Hardware Support Packages

**Data I/O**
- Ethernet, USB, Bluetooth

**Low Cost Hardware**
- Android Sensors
- Lego EV3
- Arduino

**Get Support Package Now**

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**Exhibitor:**
Vision algorithm design and Hardware Implementation on Xilinx Zynq

Connect low-cost hardware directly to MATLAB and Simulink

**iPhone**
MATLAB
New fundamental data types

- **table**
  - For mixed-type tabular data
  - Supports flexible indexing
  - Built-in functionality (merge, sort, etc.)

- **categorical arrays**
  - For discrete non-numeric data
    - Values drawn from a finite set of possible values ("categories")
    - Can be compared using logical operators
      - Similar to numeric arrays
MATLAB
Importing Data

- Import Tool
  - Interactive import of delimited and fixed-width text files
  - Provides improved handling of numbers, text, and dates
  - Automatically generate MATLAB code (scripts and functions) to automate the process

- Access online data (**webread**)
  - JSON, CSV, and image data

- Read and write data from network-connected devices (**tcpclient**)

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Usability
Where is MATLAB and Simulink Today?

Exhibitor:
Model-Based Control Design and Rapid Prototyping of a Motion System
Simulink – Accelerate Model Building
Smart Editing Cues
Simulink: Comment Out and Comment Through

Comment a block so that the output equals the input

- Signal passes through the block during simulation
- Comment out option remains available
- Works on blocks with the same number of inputs and outputs
New Graphics System

Overview

- **New look**
  - New default colormap and line colors
  - Anti-aliased fonts and lines
  - Subtler grid lines

- **Easier to customize**
  - Graphics objects now behave like other MATLAB objects
  - Support dot-notation to access and change properties

Data easier to interpret

\[
\begin{align*}
\text{\texttt{p = plot(x,y);}} \\
\text{\texttt{p.Color = 'red';}}
\end{align*}
\]
New Graphics System

- Multilingual text and symbols
- Automatic updating of datetime tick labels
- New visualization functions
  - histogram
  - animated line
- Multiple colormaps per figure
- Rotatable tick labels
- User interfaces with tab panels
MATLAB: Date and Time Arrays
Simulink – Better Simulation Data Analysis

New Simulation Data Inspector
Simulink – Tune and Monitor Your Simulations

New graphical controls and displays in Simulink
Scalability
Data Capabilities in MATLAB

Memory and Data Access
- 64-bit processors
- Memory Mapped Variables
- Disk Variables
- Databases
- Datastores

Programming Constructs
- Streaming
- Block Processing
- Parallel-for loops
- GPU Arrays
- SPMD and Distributed Arrays
- MapReduce

Platforms
- Desktop (Multicore, GPU)
- Clusters
- Cloud Computing (MDCS on EC2)
- Hadoop
Simulink – Performance Advisor
Simulink – Faster Consecutive Simulations

Fast Restart
Stateflow: Start Simulation Faster
Just-In-Time Compilation

Presentation: Verify, Validate, and Document Models and Code
Collaboration
MATLAB and Simulink: Managing Code and Models

Source Control Integration

- Manage code from MATLAB Desktop and Simulink Projects
- Leverage source control capabilities
  - Git and Subversion integration in Current Folder browser
- Use Comparison Tool to view and merge changes between revisions
Simulink – Sharing Projects

Share a project on GitHub® via e-mail or as a MATLAB Toolbox

- Make your project publicly available on GitHub
- Share your project via email
- Package your project as a MATLAB toolbox
Simulink Data Dictionary

Store, edit and access design data using the data dictionary

- Componentization
- Scalability and performance
- Requirements linking
- Change tracking and differencing
- Defined model-data relationship
- Integration with Simulink Projects
Concluding Remarks

- Methods for improving **ease-of-use** during the design process

- Convey information in a universal manner and make it **simple to share**

- “**Scale up**” and “**Scale out**”

- Work together to a common purpose to achieve **business benefits**
Visualization
Collaboration
Usability
Scalability