MATLAB 7 for Technical Computing in the Automotive Industry

June 15, 2004

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Agenda

- Introduction
- MATLAB 7 capabilities
- Demonstrations
  - Lane marking identification
  - Electronic throttle reliability test
  - Spectral analysis application
MATLAB Capabilities for Technical Computing

Data Access

Software
* Languages
* Applications

Hardware

Analysis

Visualization

Reporting & Documentation

Deployment

The MathWorks International Automotive Conference
MATLAB 7 Expands the Scope of Technical Computing

■ Productivity
  ● Interactive plotting
  ● Iterative programming
  ● Developing and managing larger programs

■ Performance
  ● Integer and single-precision math
  ● Computation optimizations
  ● Fast access to larger data

■ More applications
  ● 5 new toolboxes and 14 major updates
  ● MATLAB Compiler 4
Demonstrations

- Algorithm development
  - Lane marking identification

- Data visualization and statistical analysis
  - Electronic throttle reliability test

- Application deployment
  - Soundcard audio spectral analysis
Lane Marking Identification

- Lane departure a major cause of road accidents
- Part of lane departure warning systems
- Now a new safety feature in luxury cars and trucks
All Major New Features For Algorithm Development and Programming

- Development tools and desktop
  - Redesigned desktop
  - Enhanced Array Editor and Workspace Browser
  - Directory Reports
  - M-Lint Code Checker
  - Cell execution
  - Automatic publishing of your M-code

- Programming
  - Nested and Anonymous functions and function handle calling
  - Conditional breakpoints
  - Block comments

- Mathematics
  - Integer math
  - Single-precision math
  - More robust computational geometry
  - linsolve function
  - New ODE solvers
Demonstrations

- Algorithm development
  - Lane marking identification

- Data visualization and statistical analysis
  - Electronic throttle reliability test

- Application deployment
  - Soundcard audio spectral analysis
Electronic Throttle Reliability Test

- Measured throttles performance over long period

- Throttle value here, opens and closes to regulates air flow

- Large dataset stored in a text file
All Major New Features for Data Visualization and Statistics

■ Graphics
  ● Interactive plot creation with plot tools
  ● M-code generation from a figure
  ● New plot annotation
  ● Panning and data cursors
  ● Transform object
  ● User interface panels and button groups, ActiveX in GUIDE
  ● Full TeX and LaTeX

■ Data Access
  ● textscan, xlswrite, hdf5write
  ● Compressed MAT-files
  ● javaaddpath function
  ● Enhanced COM support
  ● Web services, FTP
  ● Unicode support

■ Statistics Toolbox
  ● Distribution fitting tool
  ● Multivariate plots
  ● Enhanced maximum likelihood estimates
  ● Support for N-D arrays
Demonstrations

- Algorithm development
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- Data visualization and statistical analysis
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- Application deployment
  - Soundcard audio spectral analysis
Deploying Results

- Stand-alone
- Integrate MATLAB applications with C/C++, Java, COM, or Excel based applications
MATLAB 7 Impacts the Entire Organization
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