MATLAB 7 for Technical Computing in the Automotive Industry

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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
  ● \texttt{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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  - 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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