What’s New in MATLAB for Technical Computing

R2014b - R2016a

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Agenda

- New MATLAB Graphics System **R2014b**
- App Designer **R2016a**
- New Data Type for Handling Dates **R2014b**
- Redesigned MATLAB Execution Engine **R2015b**
- Live Editor **R2016a**
New Graphics System

- **New look**
  - New default colormap and line colors
  - Smoother text 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

```
p = plot(x,y);
p.Color = 'red';
```
New Graphics System

Features

- Rotatable tick labels
- Multiple colormaps per figure
- Increased control for customizing plot axes
- Multiple y-axis plots
- User interfaces with tab panels
- Steady stream of new graphics features continuously being added
App Designer

- Enhanced design environment
- Expanded UI component set
- Code integration
  - Tight synchronization of design and code views with embedded editing
  - New object-based code format

Built on Web Technology
App Designer is Not a Replacement for GUIDE (today)

- Limited graphics support
  - Only 2D line and scatter plots are supported
  - Does not support zoom, pan, rotate
  - Does not support custom interaction through mouse and keyboard callbacks

- Some existing UI components are not supported
  - e.g., components for creating menus, toolbars, or tables
Date and Time Arrays

- `datetime` for representing a point in time
- `duration`, `calendarDuration` for representing elapsed time
- Same data type for computation and display
  - Add, subtract, sort, compare, and plot
  - Customize display formats
  - Nanosecond precision
- Support for time zones
  - Accounts for daylight saving time
MATLAB Execution Engine

- Redesigned **execution engine** runs MATLAB code faster
  - All MATLAB code is now JIT compiled
- Function call overhead is lower
- Many object-oriented features are faster

![Graph showing performance improvement]

**Average performance improvement of 40%**
Live Editor

For this example, we will use Boston as our location. We can see how the solar time correction changes over the course of a year.

```matlab
long = -71.06;
lat = 42.36;
UTCoff = -5;

longCorr = 4*(long - 15*UTCoff);
days = 1.365;
B = 360*days/365;
EoTCorr = 9.87*sind(2*B) - 7.53*cosd(B) - 1.5*sind(B);
solarCorr = longCorr + EoTCorr

clf
plot(days,solarCorr)
axis([1 1.365 0 35])
title('Solar Time Correction')
xlabel('Day of Year')
ylabel('Minutes')
```
Summary

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