What's New in MATLAB for Technical Computing

R2014b - R2016a

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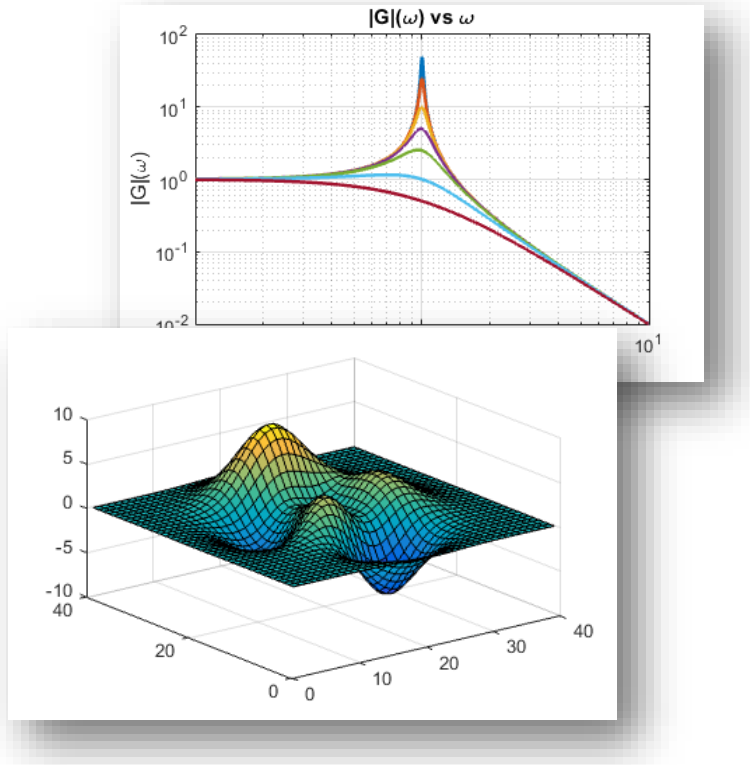
Agenda

- 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

Data easier to interpret



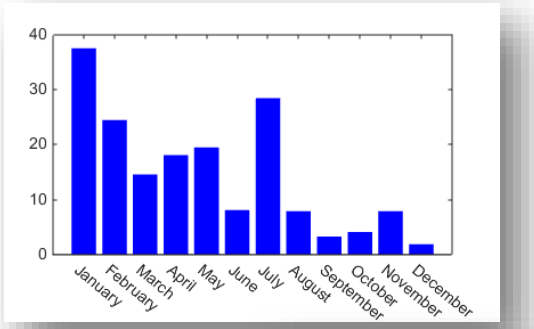
- Easier to customize
  - Graphics objects now behave like other MATLAB objects
  - Support dot-notation to access and change properties

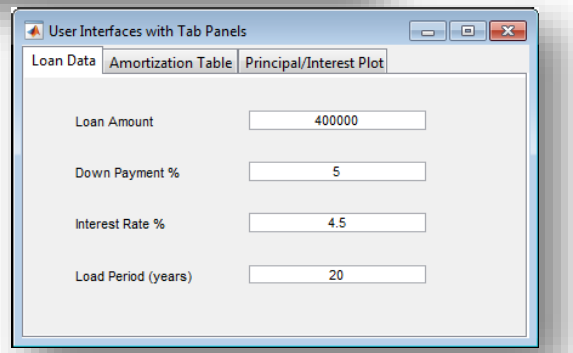
```
>> p = plot(x,y);
>> p.Color = 'red';
```

New Graphics System

Features

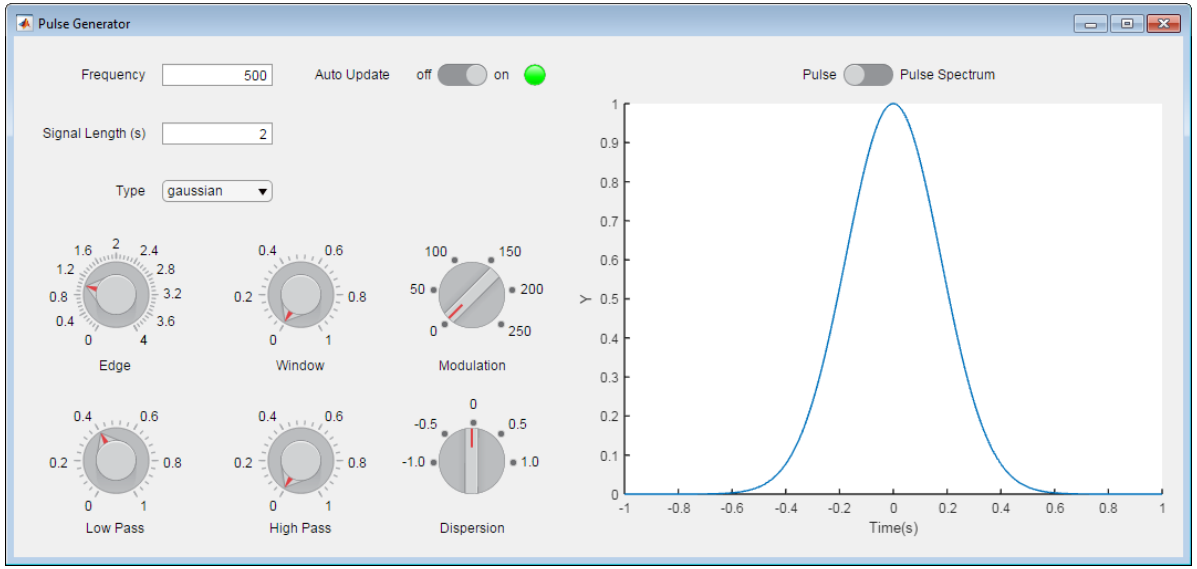
- Rotatable tick labels
- Multiple colormaps per figure
- Increased control for customizing plot axes
- Multiple y-axis plots
- User interfaces with tab panels
- Steady stream of new graphics features continuously being added





App Designer

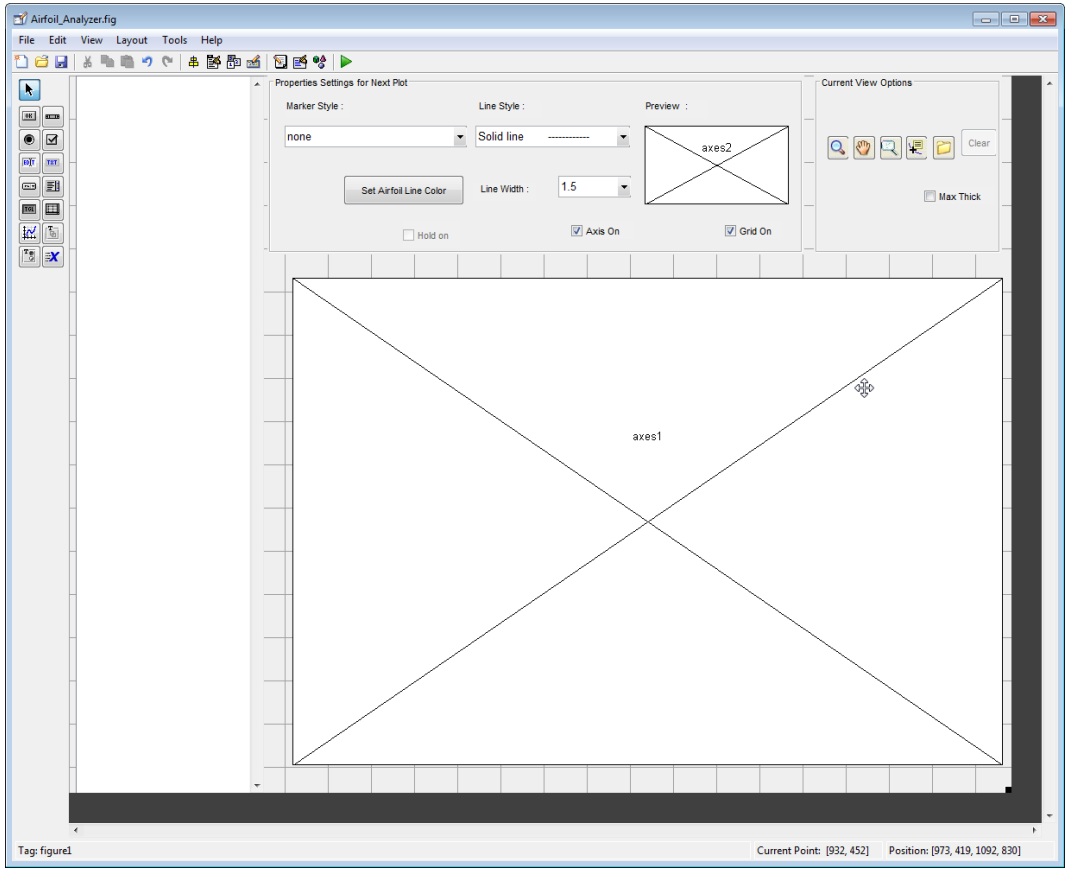
- Enhanced design environment
- Expanded UI component set
- Code integration
  - Tight synchronization of design and code views with embedded editing
  - New object-based code format



Built on Web Technology

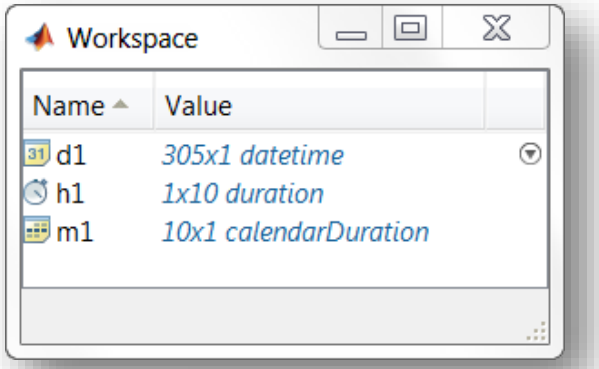
App Designer is Not a Replacement for GUIDE (today)

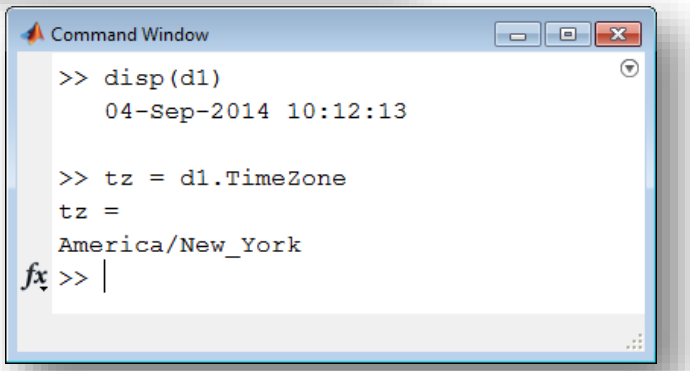
- Limited graphics support
  - Only 2D line and scatter plots are supported
  - Does not support zoom, pan, rotate
  - Does not support custom interaction through mouse and keyboard callbacks
- Some existing UI components are not supported
  - e.g., components for creating menus, toolbars, or tables



Date and Time Arrays

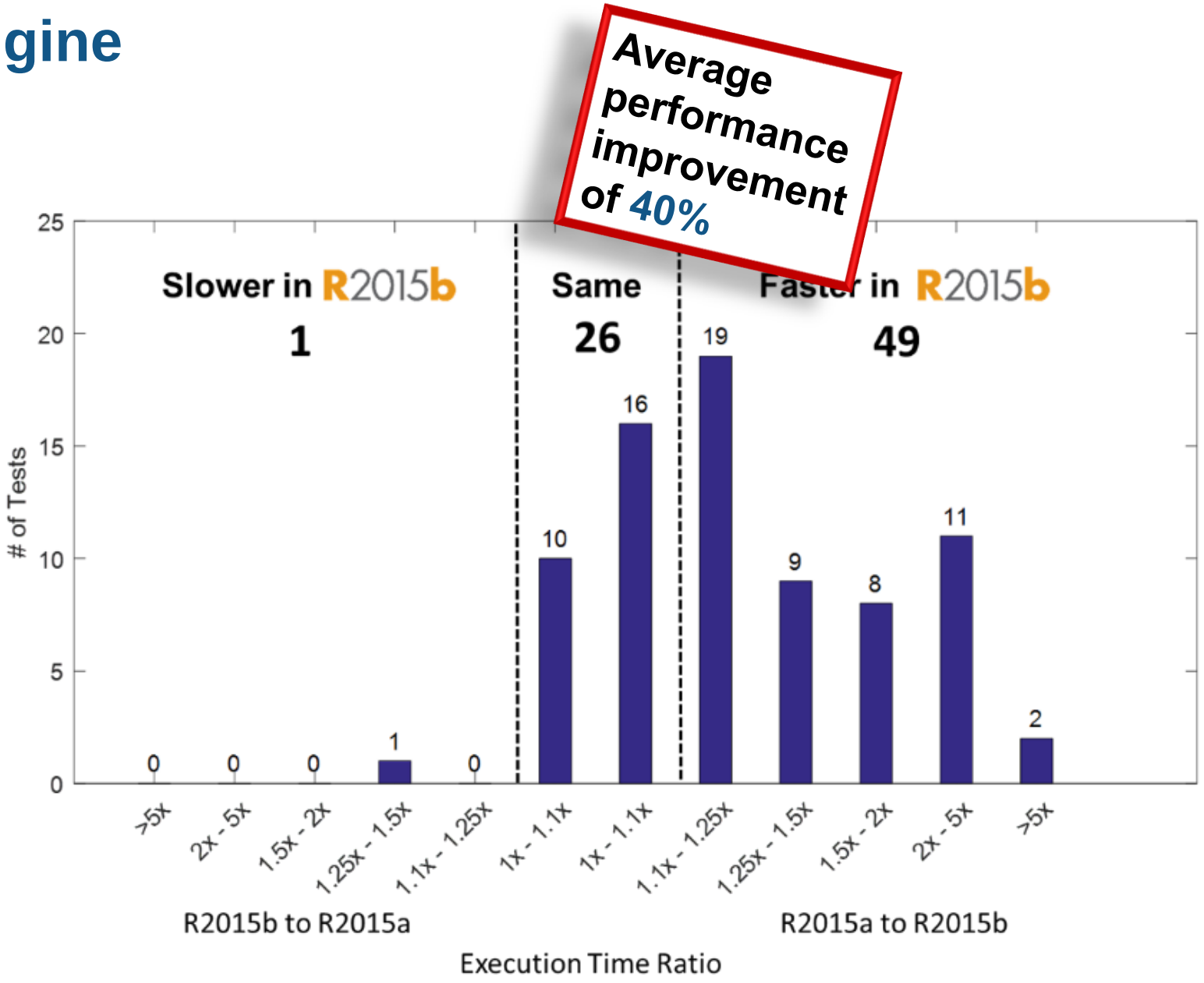
- `datetime` for representing a point in time
- `duration, calendarDuration` for representing elapsed time
- Same data type for computation and display
  - Add, subtract, sort, compare, and plot
  - Customize display formats
  - Nanosecond precision
- Support for time zones
  - Accounts for daylight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



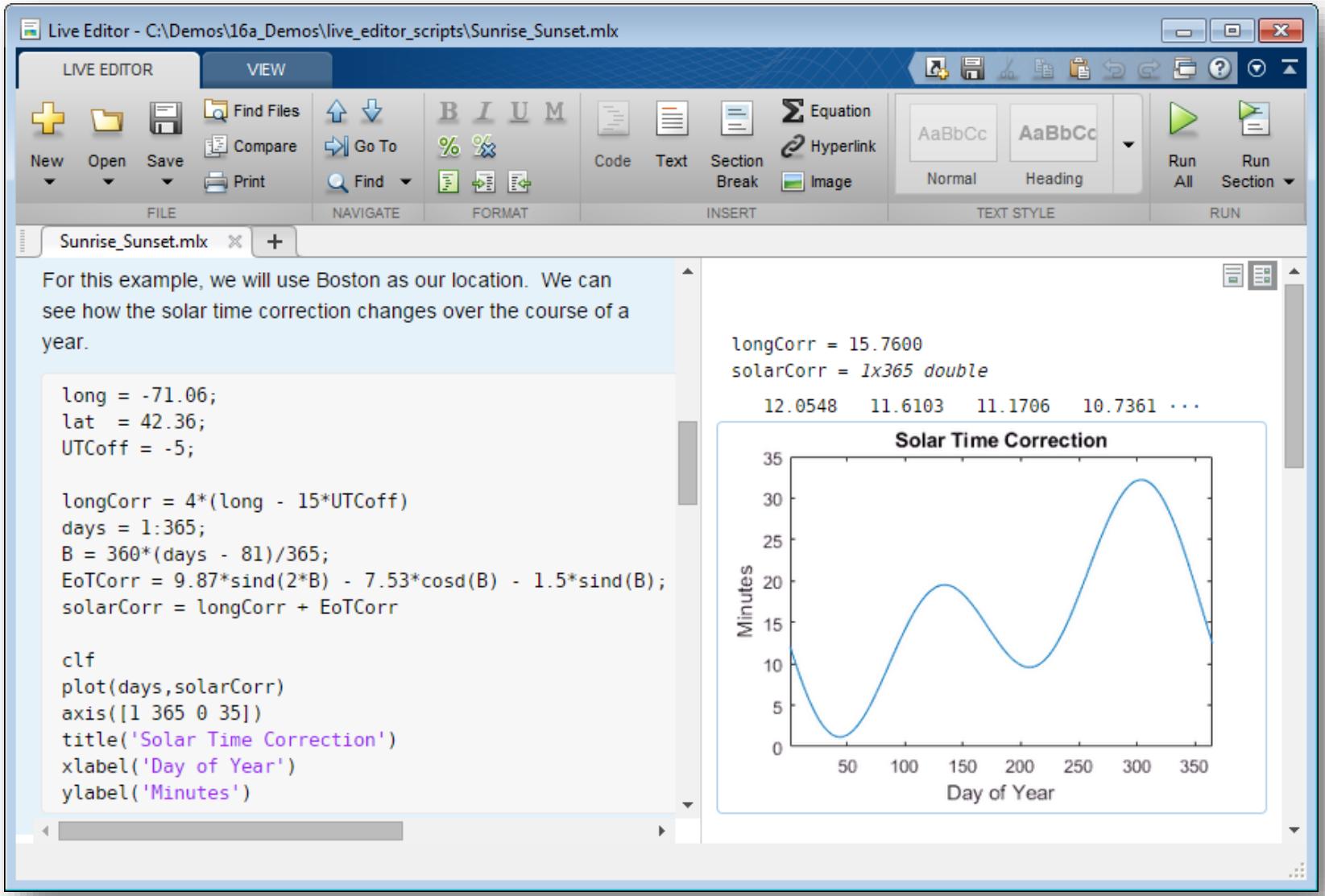


MATLAB Execution Engine

- 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



Live Editor


Live Editor - C:\Demos\16a_Demos\live_editor_scripts\Sunrise_Sunset.mlx
LIVE EDITOR
VIEW
New
Open
Save
Find Files
Compare
Print
Go To
Find
Code
Text
Section Break
Equation
Hyperlink
Image
Normal
Heading
Run All
Run Section
FILE
NAVIGATE
FORMAT
INSERT
TEXT STYLE
RUN
Sunrise_Sunset.mlx
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.
long = -71.06;
lat = 42.36;
UTCoff = -5;
longCorr = 4*(long - 15*UTCoff)
days = 1:365;
B = 360*(days - 81)/365;
EoTCorr = 9.87*sind(2*B) - 7.53*cosd(B) - 1.5*sind(B);
solarCorr = longCorr + EoTCorr
clf
plot(days,solarCorr)
axis([1 365 0 35])
title('Solar Time Correction')
xlabel('Day of Year')
ylabel('Minutes')
longCorr = 15.7600
solarCorr = 1x365 double
12.0548 11.6103 11.1706 10.7361 ···
Solar Time Correction
Minutes
Day of Year
0
5
10
15
20
25
30
35
50
100
150
200
250
300
350

Summary

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