

What's New in MATLAB 2015

Joe Hicklin

MATLAB EXPO 2015
UNITED KINGDOM

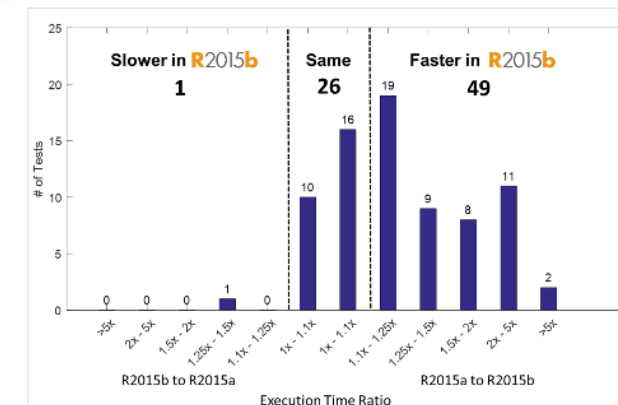
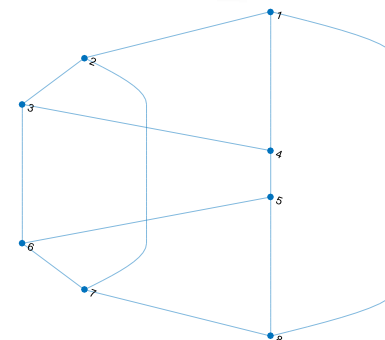
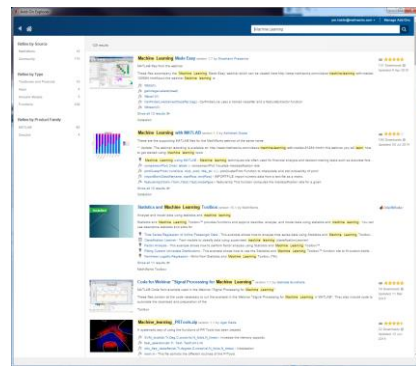
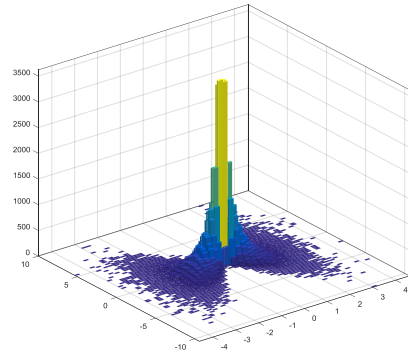
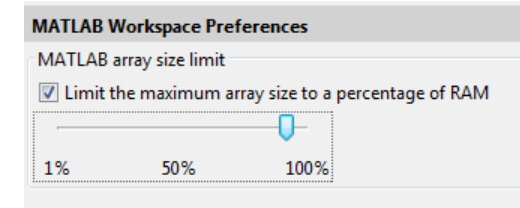
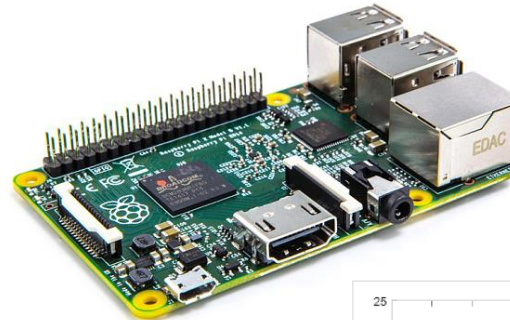
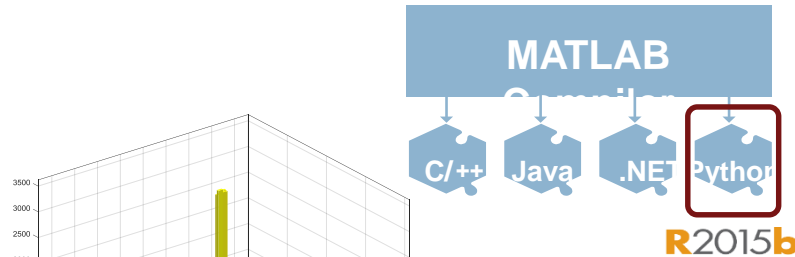
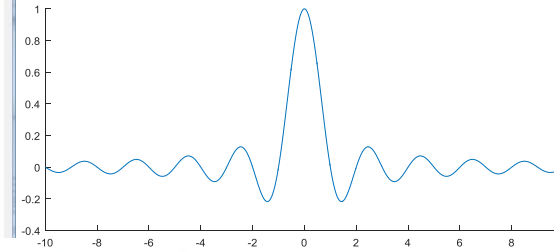
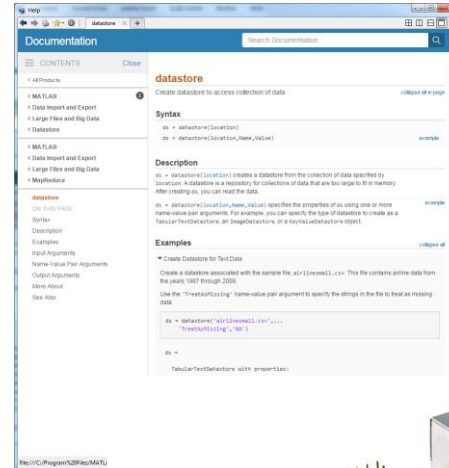
Talks showing off new features

- What's New in Simulink in Releases 2015a and 2015b
 - 11:15–11:45
- Machine Learning for Predictive Modelling
 - 14:30 – 15:15
- Development and Testing of Robotic Applications Using MATLAB and Simulink
 - 16:15 – 17:00

A quick look at some new features

```
>> T(1:15, :)
ans =
```

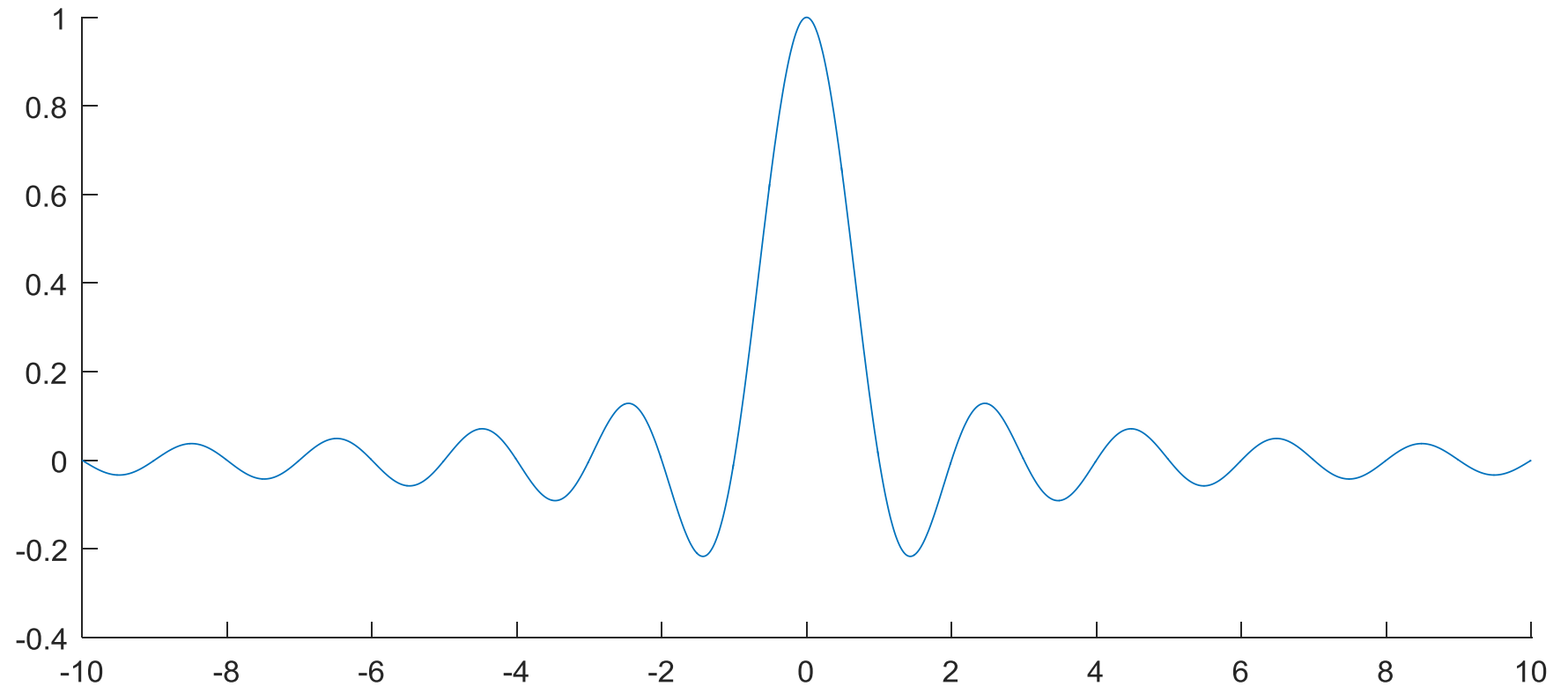
DepTime	ArrTime	UniqueCarrier	FlightNum	ArrDelay	DepDelay	Origin	Dest
'1434'	'1522'	'AS'	67	7	14	'SEA'	'KTN'
'1545'	'1628'	'AS'	67	-7	-5	'KTN'	'SIT'
'1500'	'1600'	'AS'	67	25	20	'SEA'	'KTN'
'1114'	'1342'	'TW'	469	2	-1	'SJU'	'MIA'
'1725'	'2104'	'EA'	940	-2	0	'PHL'	'SEA'
'700'	'1101'	'AA'	662	24	0	'SJU'	'JFK'
'1735'	'2131'	'AS'	688	13	0	'SJU'	'JFK'
'1829'	'2000'	'EA'	942	0	0	'SJU'	'MIA'
'1301'	'1925'	'AA'	606	-6	1	'DFW'	'SJU'
'1326'	'1947'	'AA'	919	1	7	'ORD'	'SJU'
'945'	'1249'	'AS'	60	84	65	'KTN'	'SEA'
'700'	'752'	'AS'	60	2	0	'JNU'	'KTN'
'825'	'1100'	'AS'	60	-10	0	'KTN'	'SEA'
'740'	'1034'	'AS'	60	14	0	'KTN'	'SEA'
'1002'	'1025'	'OS'	295	-9	-3	'DCA'	'IND'



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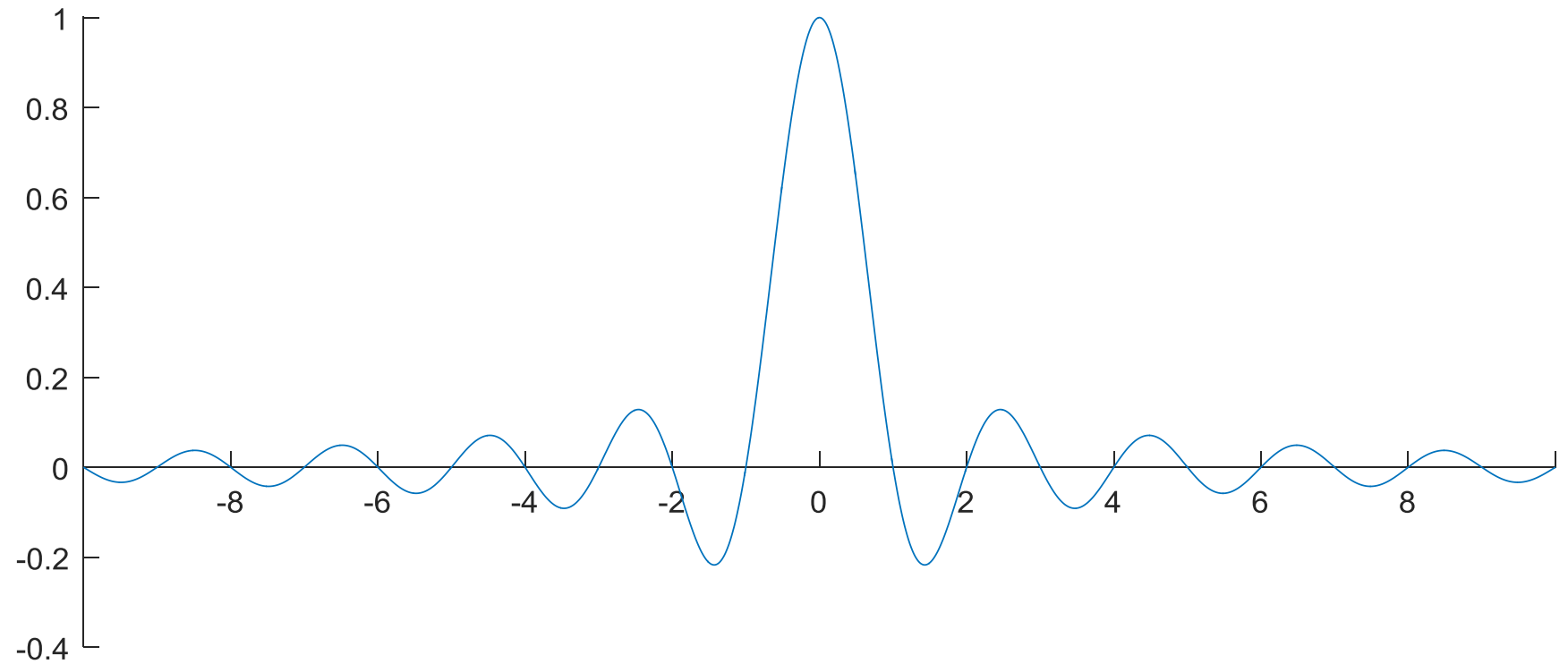
New Axis Location: origin

```
x = -10:0.01:10;  
plot(x, sinc(x))
```



New Axis Location: origin

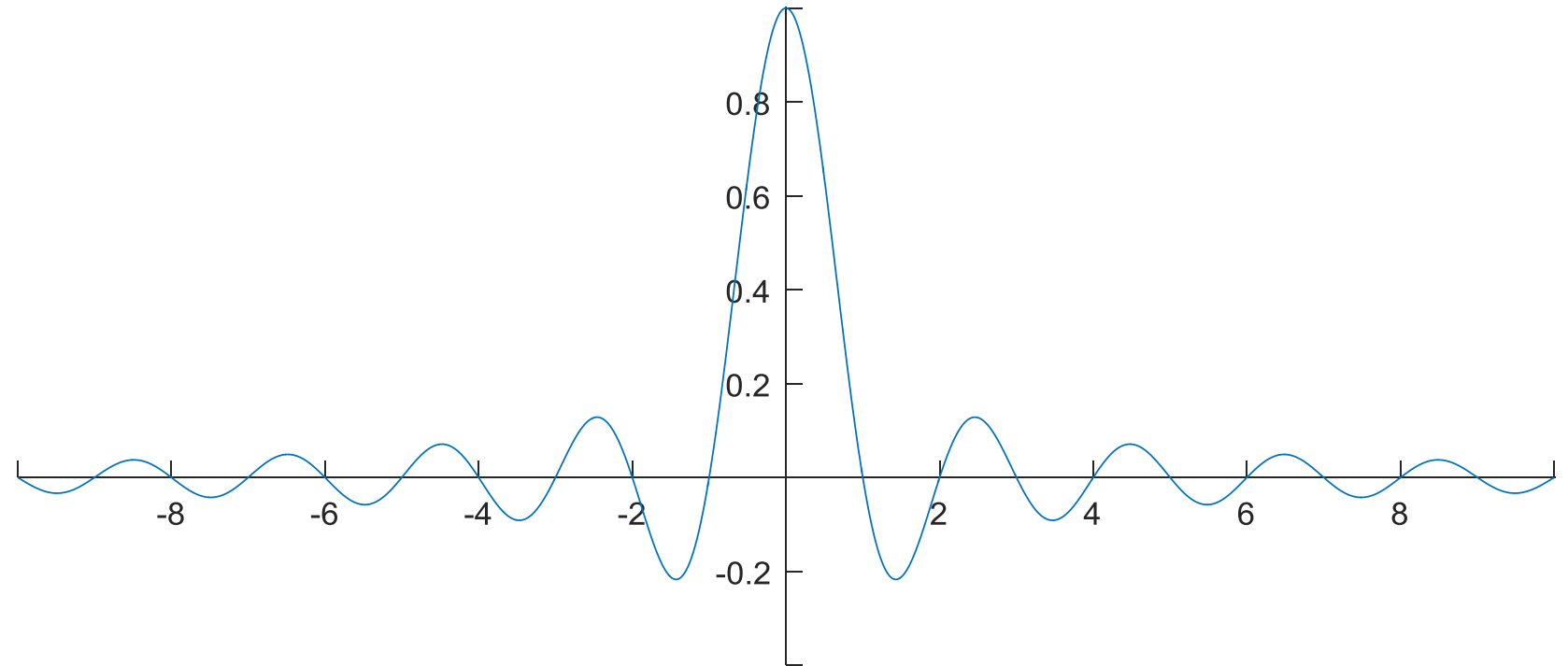
```
x = -10:0.01:10;  
plot(x, sinc(x))
```



```
set (gca, 'xaxislocation', 'origin' )
```

New Axis Location: origin

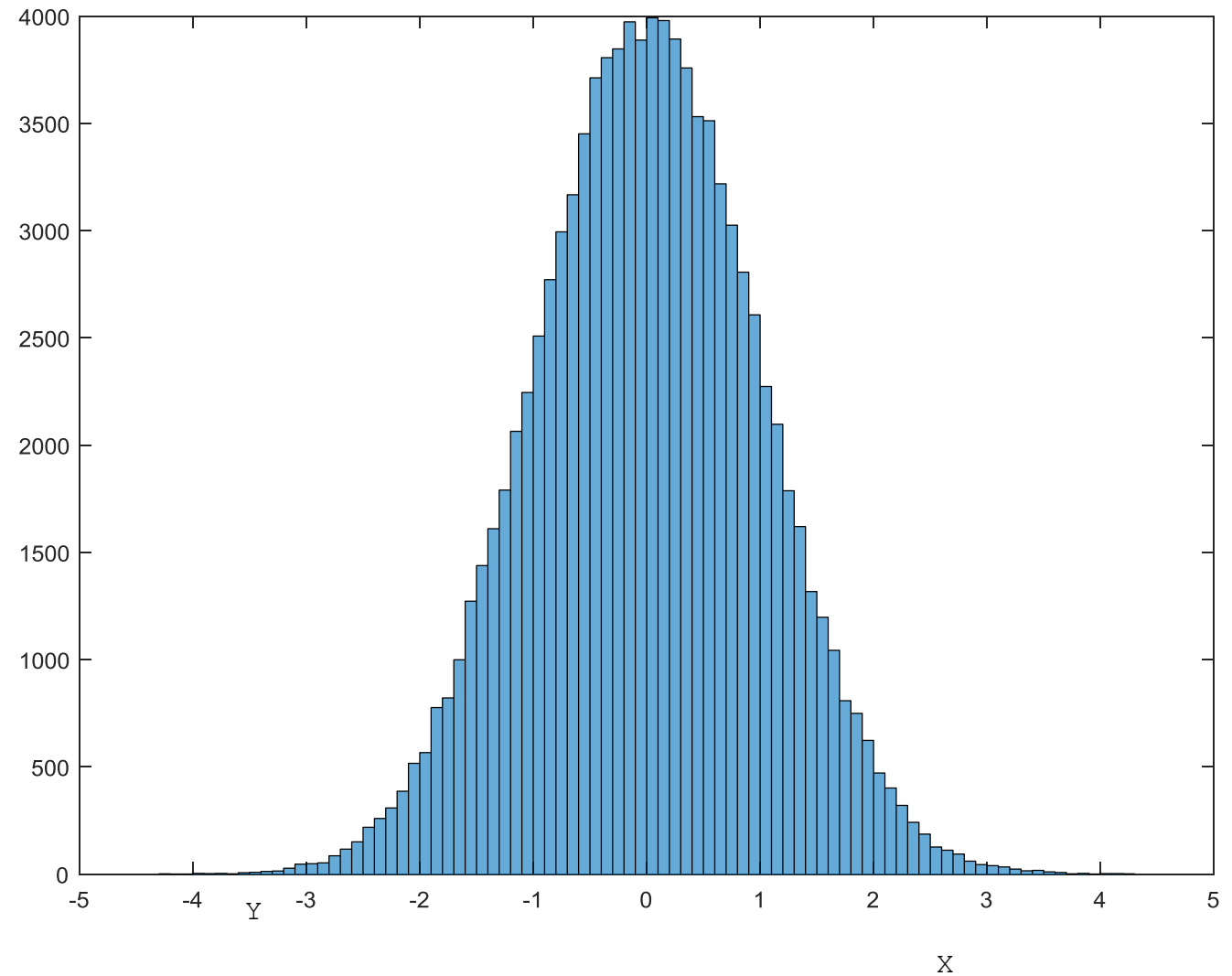
```
x = -10:0.01:10;  
plot(x, sinc(x))
```



```
set( gca, 'xaxislocation', 'origin' )  
set( gca, 'yaxislocation', 'origin' )
```

Bivariate Histograms

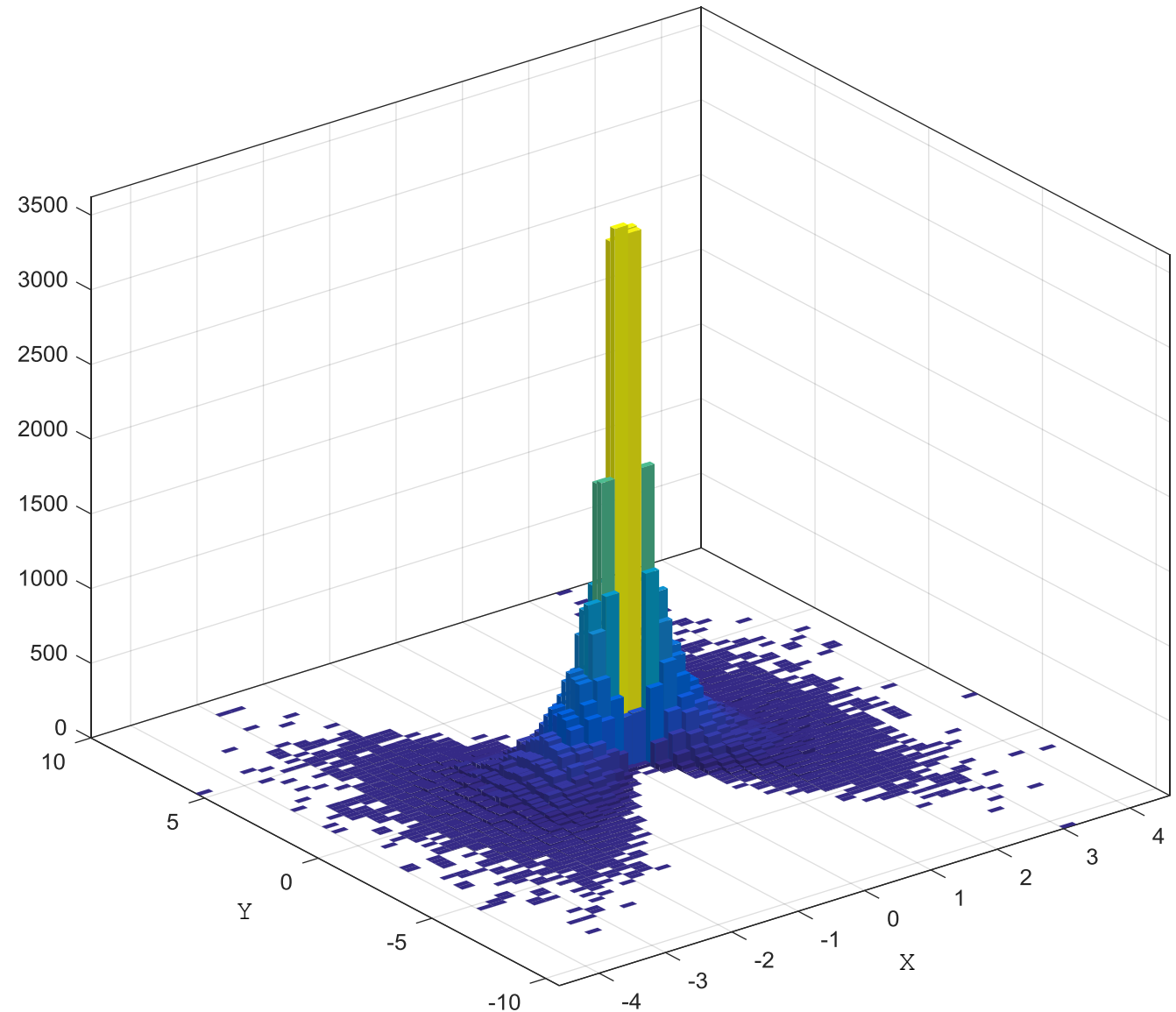
```
x = randn(100000, 1);  
  
histogram(x)
```



Bivariate Histograms

```
x = randn(100000, 1);  
y = x .* randn(100000, 1);
```

```
histogram2(x, y)
```



Array Size Limit

Have you done this?

```
% I need an array with a million elements
```

Array Size Limit

Have you done this?

```
% I need an array with a million elements  
V = rand(1000000);
```

Array Size Limit

Have you done this?

```
% I need an array with a million elements  
V = rand(1000000);
```

What happens now?

Array Size Limit

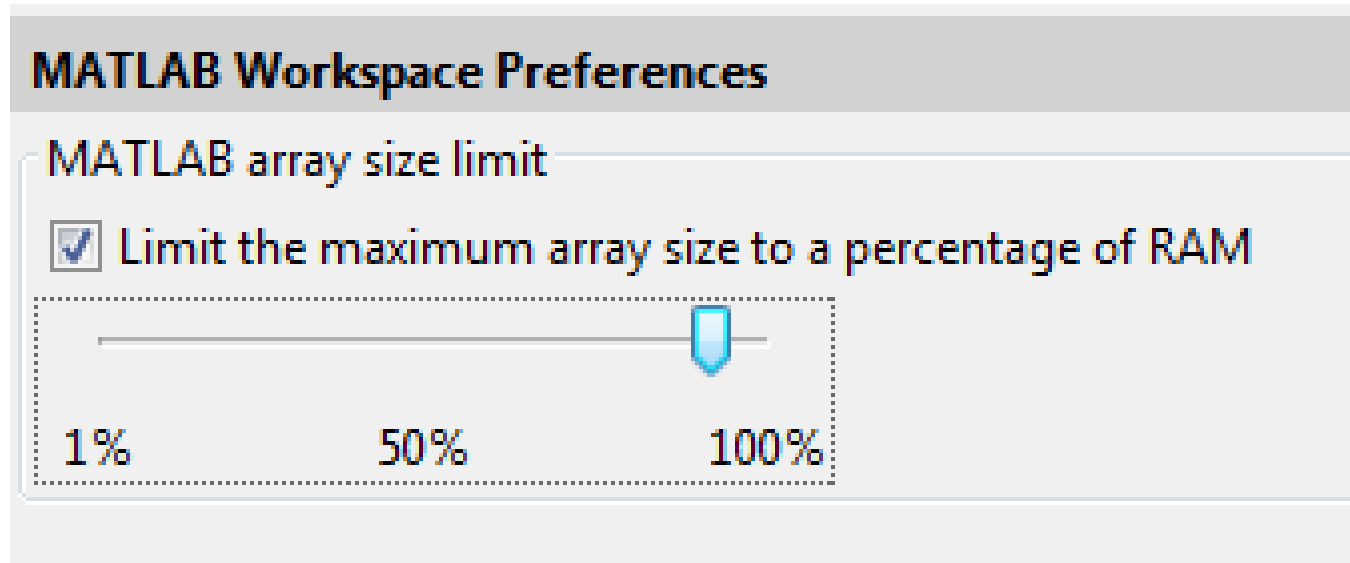
Have you done this?

```
% I need an array with a million elements  
V = rand(1000000);
```

What happens now?

```
Error using rand  
Requested 1000000x1000000 (7450.6GB) array exceeds maximum array size  
preference.
```

Array Size Limit



Error using rand

Requested 1000000x1000000 (7450.6GB) array exceeds maximum array size preference.

Working with “Grouped Data”

What is the average departure delay for each airline?

```
>> T(1:15,:)
```

```
ans =
```

DepTime	ArrTime	UniqueCarrier	FlightNum	ArrDelay	DepDelay	Origin	Dest
'1434'	'1522'	'AS'	67	7	14	'SEA'	'KTN'
'1545'	'1628'	'AS'	67	-7	-5	'KTN'	'SIT'
'1500'	'1600'	'AS'	67	25	20	'SEA'	'KTN'
'1114'	'1342'	'TW'	469	2	-1	'SJU'	'MIA'
'1725'	'2104'	'EA'	940	-2	0	'SJU'	'PHL'
'700'	'1101'	'AA'	662	24	0	'SJU'	'JFK'
'1735'	'2131'	'AA'	688	13	0	'SJU'	'JFK'
'1829'	'2000'	'EA'	942	0	0	'SJU'	'MIA'
'1301'	'1925'	'AA'	606	-6	1	'DFW'	'SJU'
'1326'	'1947'	'AA'	919	1	7	'ORD'	'SJU'
'945'	'1249'	'AS'	60	84	65	'KTN'	'SEA'
'700'	'752'	'AS'	60	2	0	'JNU'	'KTN'
'825'	'1100'	'AS'	60	-10	0	'KTN'	'SEA'
'740'	'1034'	'AS'	60	14	0	'KTN'	'SEA'
'1002'	'1025'	'US'	295	-9	-3	'DCA'	'IND'

Working with “Grouped Data”

```
[ groups, airline] = findgroups( T.UniqueCarrier );
```

```
>> groups(1:10)
```

```
ans =
```

```
4
4
4
23
9
2
2
9
2
2
```

```
airline =
```

```
'9E'
'AA'
'AQ'
'AS'
'B6'
'CO'
'DH'
'DL'
'EA'
'EV'
'F9'
'FL'
'HA'
'HP'
'ML'
'MQ'
'NW'
'OH'
'OO'
'PA'
'PI'
'PS'
'TW'
'TZ'
'UA'
'US'
'WN'
'XE'
'YV'
```

```
>> T.UniqueCarrier(1:10)
```

```
ans =
```

```
'AS'
'AS'
'AS'
'TW'
'EA'
'AA'
'AA'
'EA'
'AA'
'AA'
```

Working with “Grouped Data”

```
meanDelay = splitapply( @mean, T.DepDelay, groups );
```

```
meanDelay =
```

```
8.4664
7.8672
0.7273
7.8045
10.9007
7.6073
9.9009
7.2765
9.7174
12.3190
8.8806
10.0412
-1.1978
7.6959
2.6522
9.2473
5.7511
9.3809
7.1375
5.6855
9.3467
7.0602
7.7787
3.9444
9.2057
7.6384
8.9213
8.3746
13.5595
```

```
>> T.DepDelay(1:10)    >> groups(1:10)
```

```
ans =
```

```
14
-5
20
-1
0
0
0
0
1
7
```

```
ans =
```

```
4
4
4
23
9
2
2
9
2
2
```


Working with “Grouped Data”

```
[groups, airline] = findgroups(T.UniqueCarrier);
meanDelay = splitapply(@mean, T.DepDelay, groups);
table(airline, meanDelay)
```

airline	meanDelay
'9E'	8.4664
'AA'	7.8672
'AQ'	0.72727
'AS'	7.8045
'B6'	10.901
'CO'	7.6073
'DH'	9.9009
'DL'	7.2765
'EA'	9.7174
'EV'	12.319
'F9'	8.8806
'FL'	10.041
'HA'	-1.1978
'HP'	7.6959
'ML'	2.6522
'MQ'	9.2473
'NW'	5.7511
'OH'	9.3809
'OO'	7.1375
'PA'	5.6855
'PI'	9.3467
'PS'	7.0602
'TW'	7.7787
'TZ'	3.9444
'UA'	9.2057
'US'	7.6384
'WN'	8.9213
'XE'	8.3746
'YV'	13.559

We support many types of hardware

Hardware Support

- Overview
- Search Hardware Support**
- Request Hardware Support

Refine by Vendor

3D Robotics	1
3S-Smart Software Solutions	1
Adimec	3
ADLINK	3
Advantech	2
Agilent	4
Aldebaran	2
Allied Vision Technologies	7


Refine by Application

Communications Systems	12
Control Systems	38
Digital Signal Processing	43
Embedded Systems	60
FPGA Design	19
Image Processing and Computer Vision	56
Internet of Things	5
Robotics	45

Refine by Protocol or Standard

Audio Standards	7
Bluetooth	5
CAN	7
Ethernet	21
I2C/SPI	7
Safety Standards	10
Serial	16

Results 1 - 25 of 167




Adimec Camera Support from Image Acquisition Toolbox

Use Adimec cameras with MATLAB and Simulink to acquire video and images.

Vendors: [Adimec](#)

Tags: [MathWorks Supported](#)




ADLINK Support from Data Acquisition Toolbox

Create your own waveforms, measurement and analysis routines, and applications for ADLINK DAQ hardware using MATLAB and Data Acquisition Toolbox

Vendors: [ADLINK](#)

Tags: [Connections Program](#)




Allied Vision Camera Support from Image Acquisition Toolbox

Use AV cameras with MATLAB and Simulink to acquire video and images.

Vendors: [Allied Vision Technologies](#)

Tags: [MathWorks Supported](#)




Altera DE2 Support from Simulink

Digital circuit development platform for hardware design and verification

Vendors: [Altera](#)

Tags: [HDL Code Generation](#), [MathWorks Supported](#)




Altera Development Board Support from HDL Coder

Automatically generate HDL code from MATLAB and Simulink for Altera development boards.

Vendors: [Altera](#)

Tags: [HDL Code Generation](#), [MathWorks Supported](#), [Support Package Installer Enabled](#)

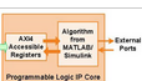


Altera FPGA Board Support from HDL Verifier

Use HDL Verifier for FPGA-in-the-loop (FIL) support for FPGA-based verification on Altera FPGA boards.

Vendors: [Altera](#)

Tags: [MathWorks Supported](#), [Support Package Installer Enabled](#)



Altera SoC FPGA Support from Embedded Coder

Use Simulink and Embedded Coder to generate C/C++ code for Altera Cyclone V SoCs.

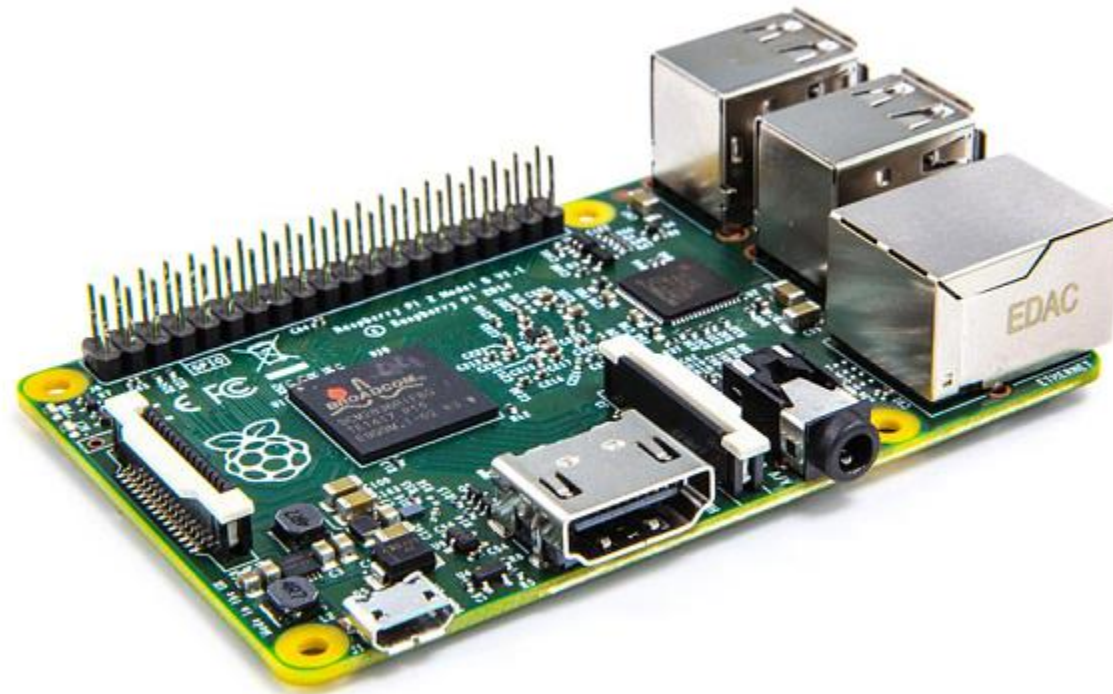
Vendors: [Altera](#), [ARM](#)

Tags: [C/C++ Code Generation](#), [Connections Program](#), [MathWorks Supported](#), [Support Package Installer Enabled](#)

And now there are two more

We have added support
for two popular new
systems:

Raspberry Pi 2
900 MHz
Quad core
1 GB ram



And now there are two more

We have added support
for two popular new
systems:

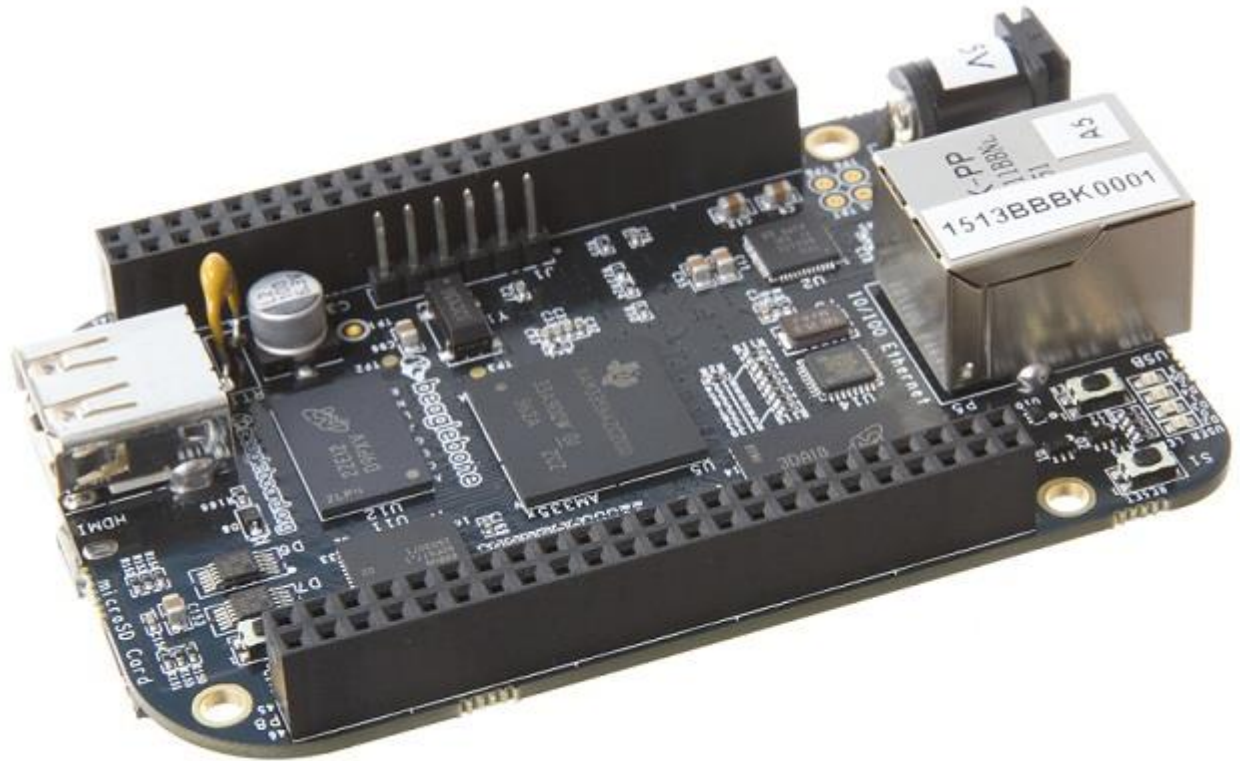
BeagleBone Black

1 GHz

512 MB ram

4GB flash rom

3D Graphics

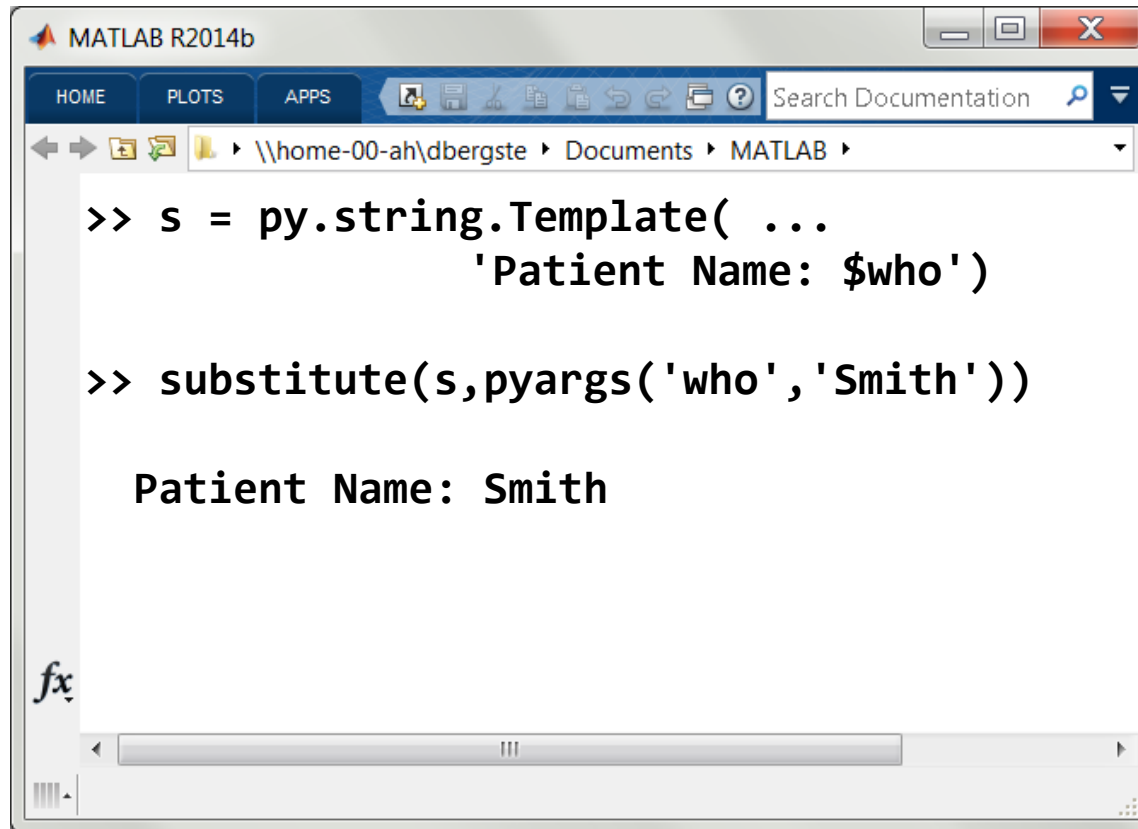


Python Integration

- MATLAB integrates with several programming languages:
 - C/C++
 - Java
 - FORTRAN
 - COM
 - .NET
 - Python

Call Python from MATLAB

MATLAB Interface to Python



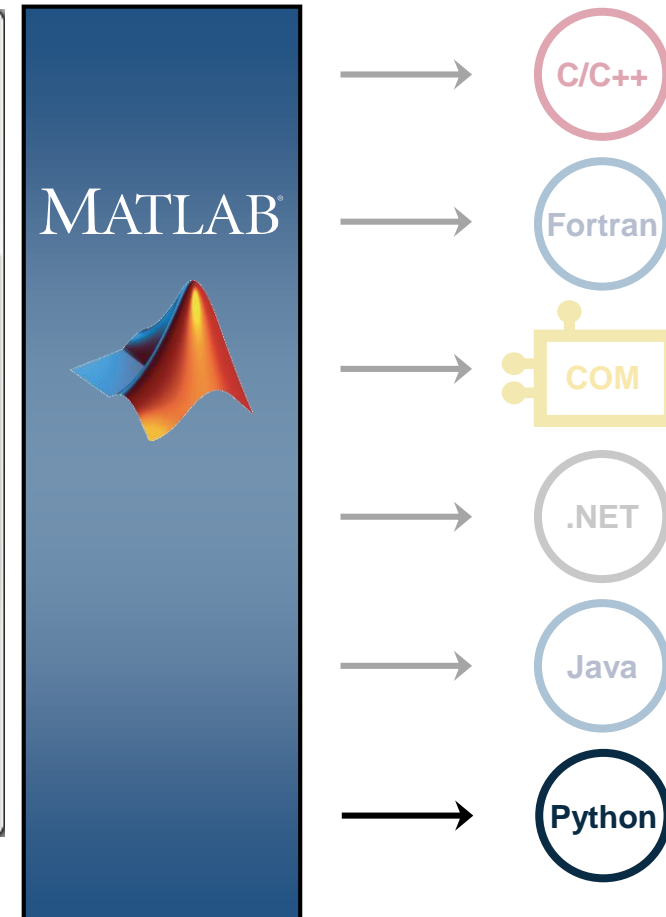
The image shows a screenshot of the MATLAB R2014b software interface. The window title is "MATLAB R2014b". The top menu bar includes "HOME", "PLOTS", and "APPS". Below the menu bar is a toolbar with various icons and a "Search Documentation" search bar. The main workspace displays a script with the following code:

```
>> s = py.string.Template( ...  
    'Patient Name: $who')  
  
>> substitute(s,pyargs('who','Smith'))
```

The output of the script is displayed below the code:

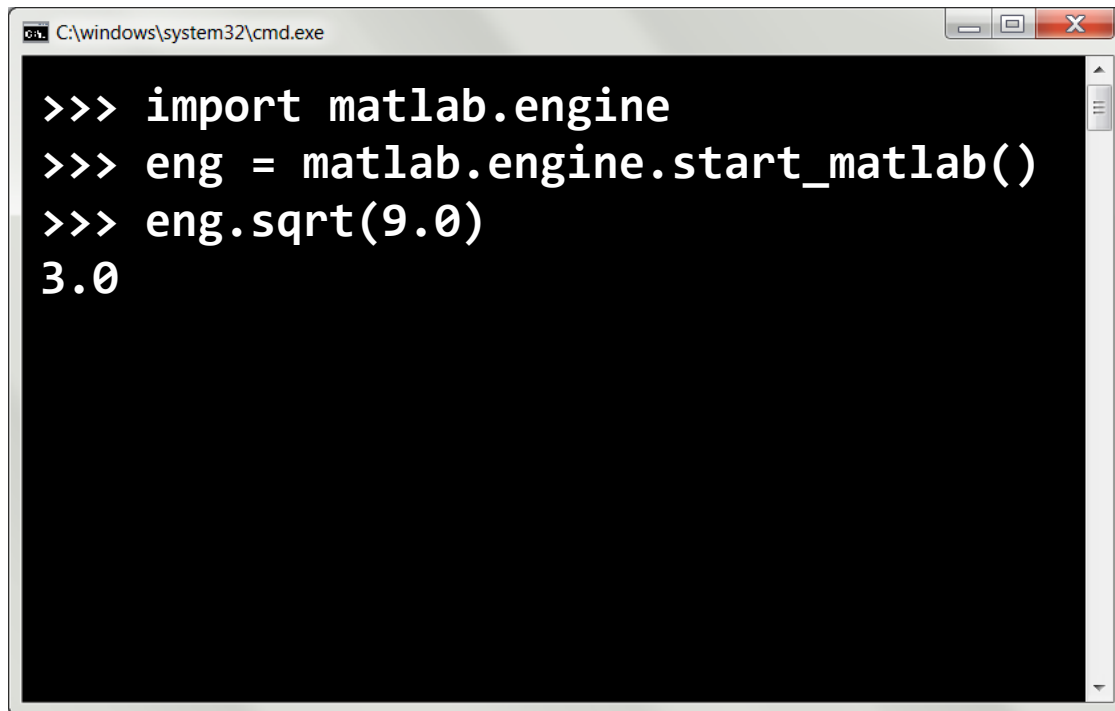
```
Patient Name: Smith
```

The script editor shows the file path: "\\home-00-ah\dbergste \ Documents \ MATLAB \". The bottom of the window features a command window with the "fx" icon and a scroll bar.

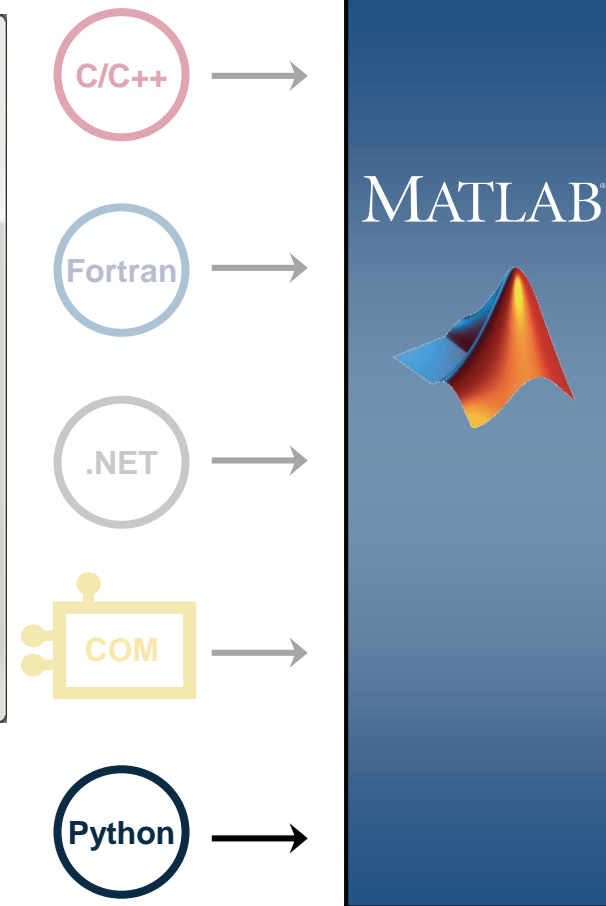


Call MATLAB from Python

MATLAB Engine API

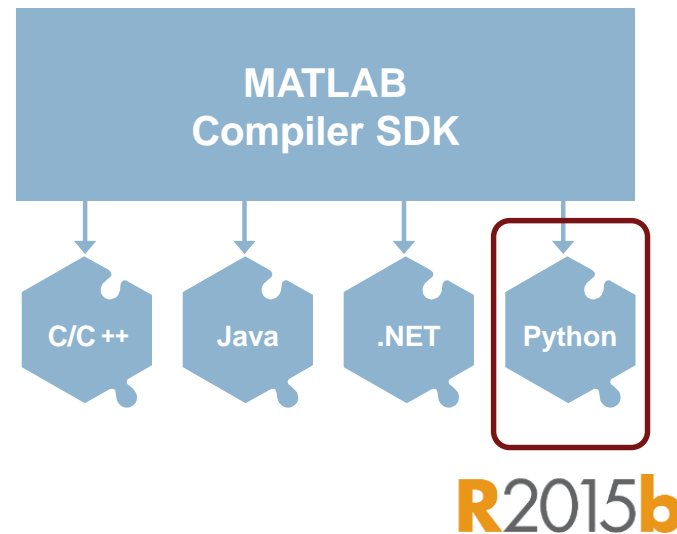


```
>>> import matlab.engine  
>>> eng = matlab.engine.start_matlab()  
>>> eng.sqrt(9.0)  
3.0
```



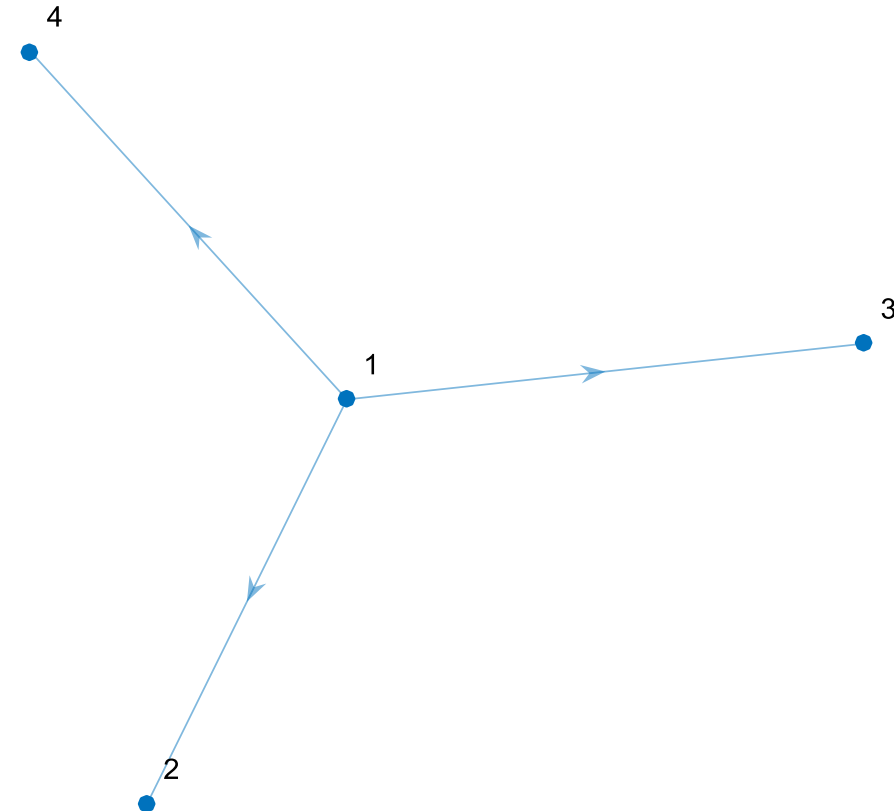
Deploy MATLAB Components for Python

- MATLAB Compiler SDK
 - Creates deployable MATLAB components for integration with applications written in Python



Graphs in MATLAB

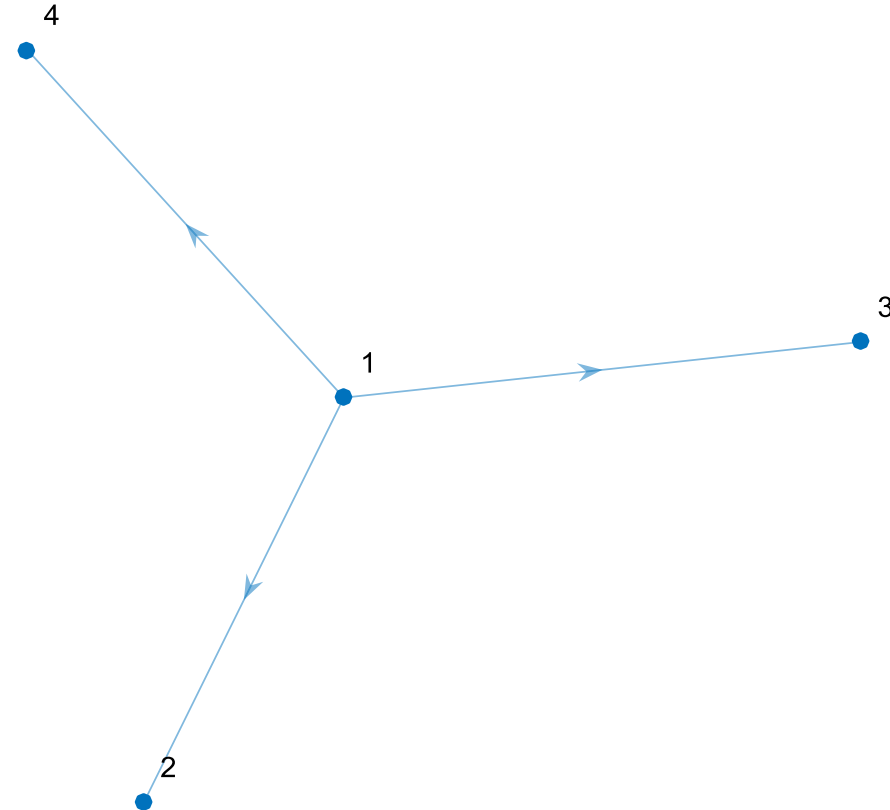
A directed graph
with four nodes
and three edges.



Graphs in MATLAB

A Graph object
Create
Manipulate
Analyze

A GraphPlot object
View



Let's make a simple Graph

```
sourceNodes = [ 1 1 1 2 2 3 3 4 5 5 6 7 ];
```

```
targetNodes = [ 2 4 8 3 7 4 6 5 6 8 7 8 ];
```

```
G = graph( sourceNodes , targetNodes )
```

```
G =
```

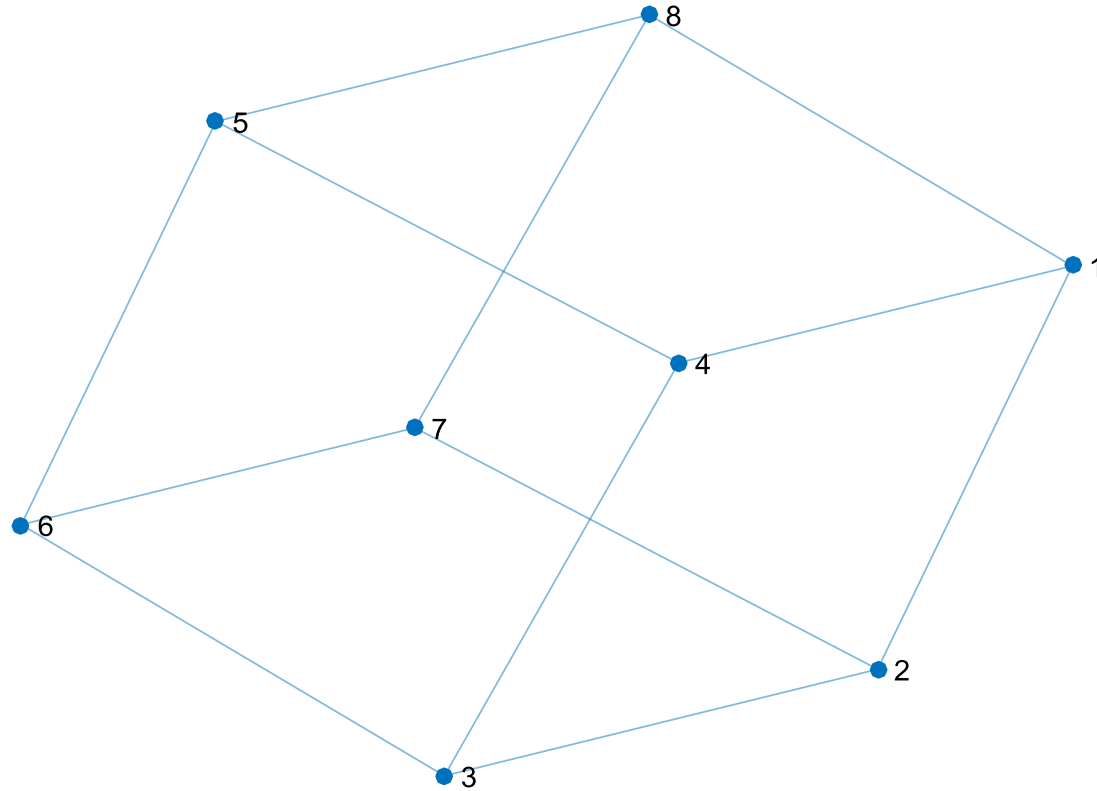
```
graph with properties:
```

```
Edges: [12x1 table]
```

```
Nodes: [8x0 table]
```

Plot a Graph

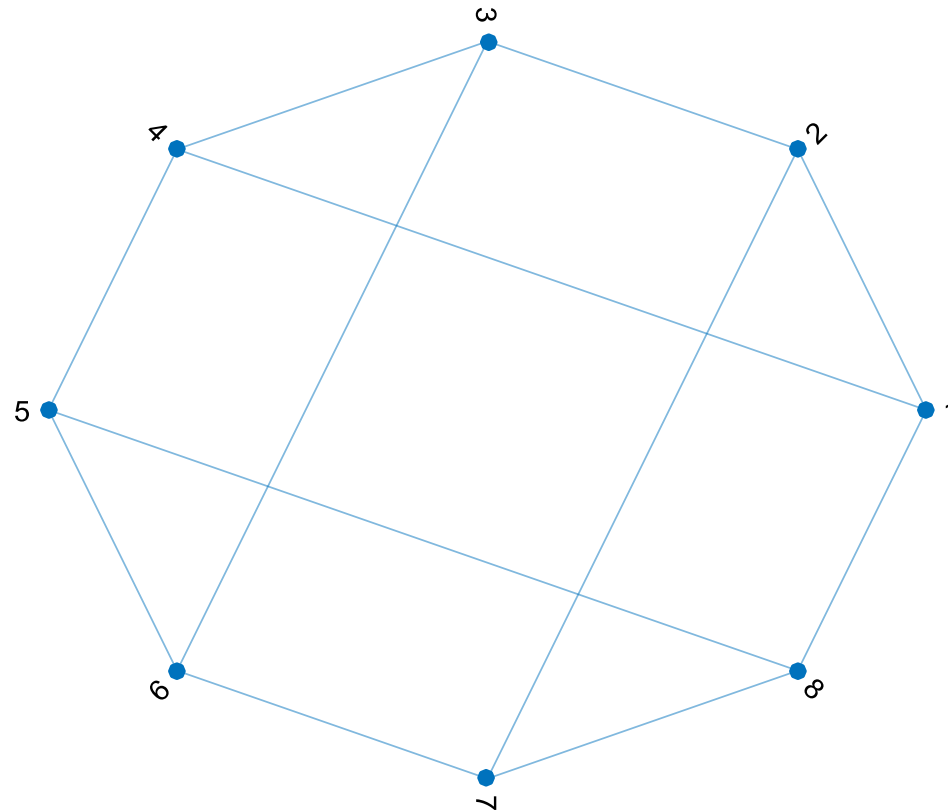
```
P = plot(G);
```



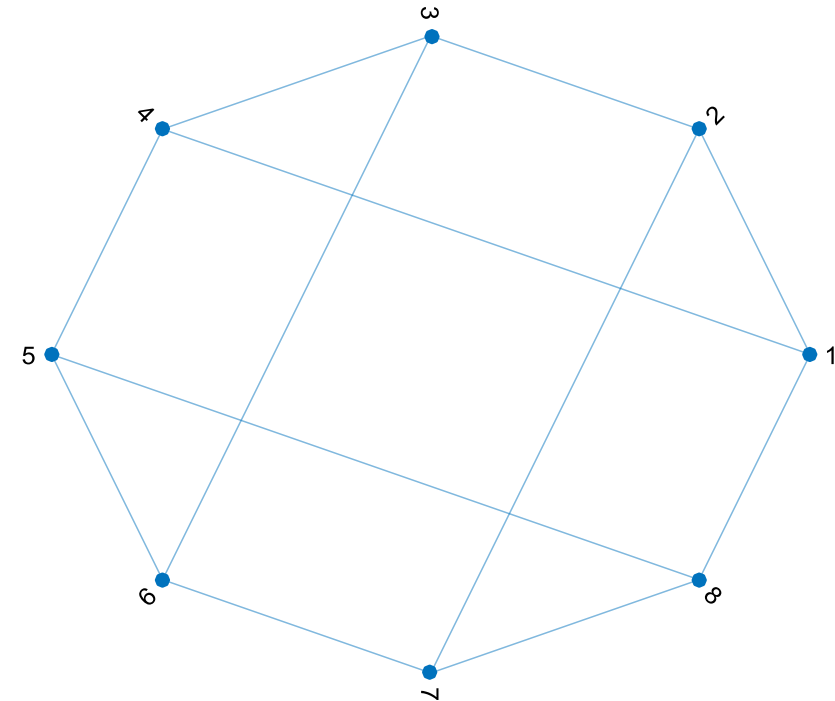
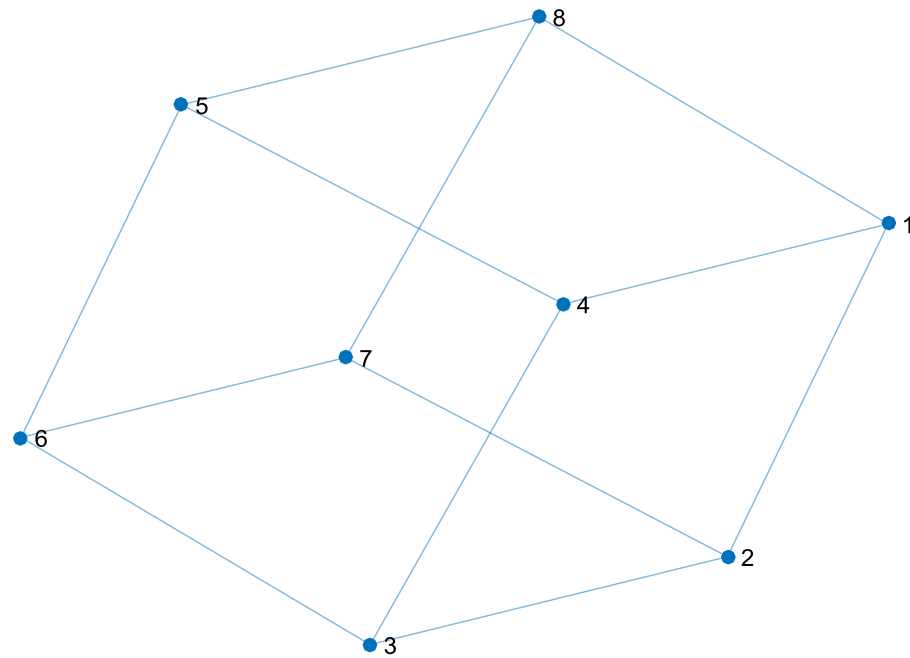
```
sourceNodes = [1 1 1 2 2 3 3 4 5 5 6 7];  
targetNodes = [2 4 8 3 7 4 6 5 6 8 7 8];
```

Plot a Graph

```
layout( P, 'circle' )
```

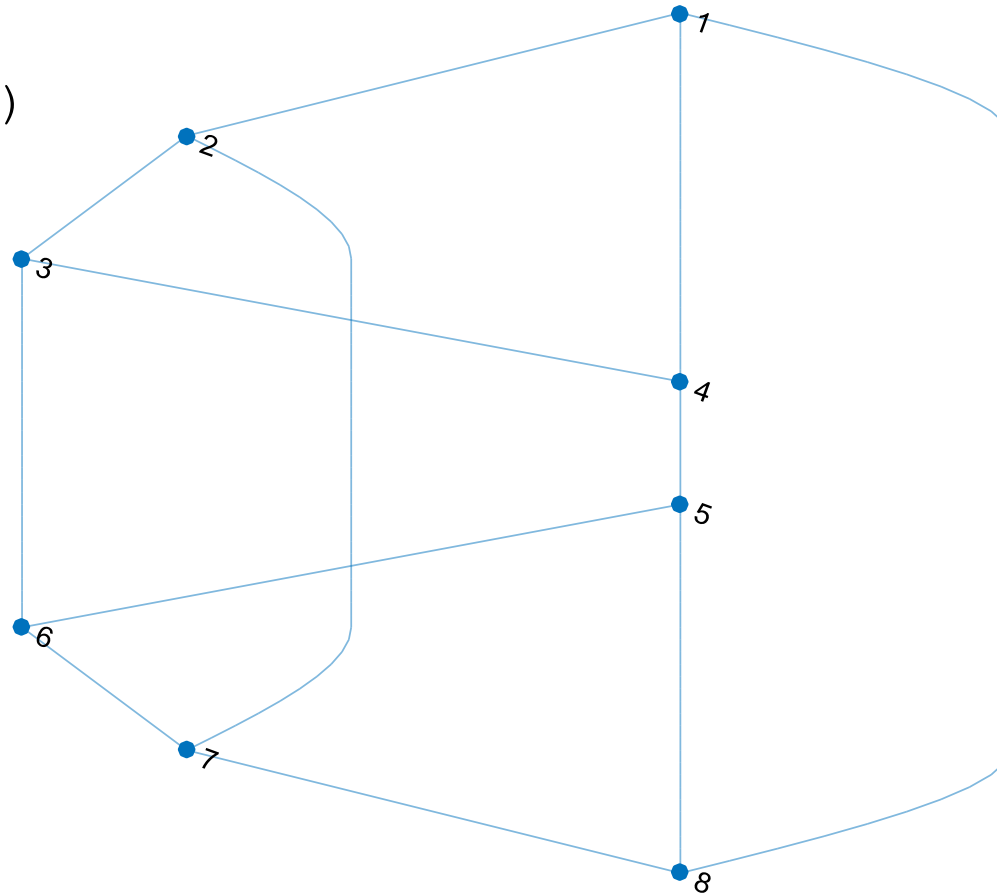


Are these drawings of the same graph?



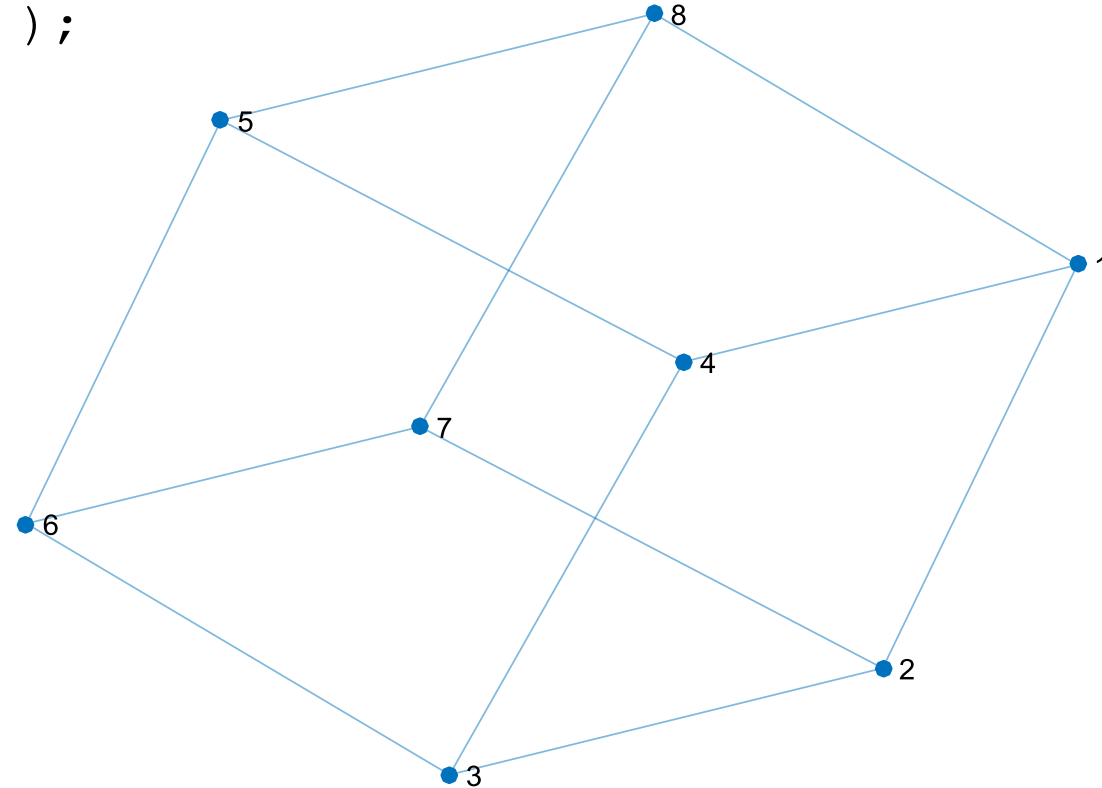
Plot a Graph

```
layout(P, 'layered' )
```



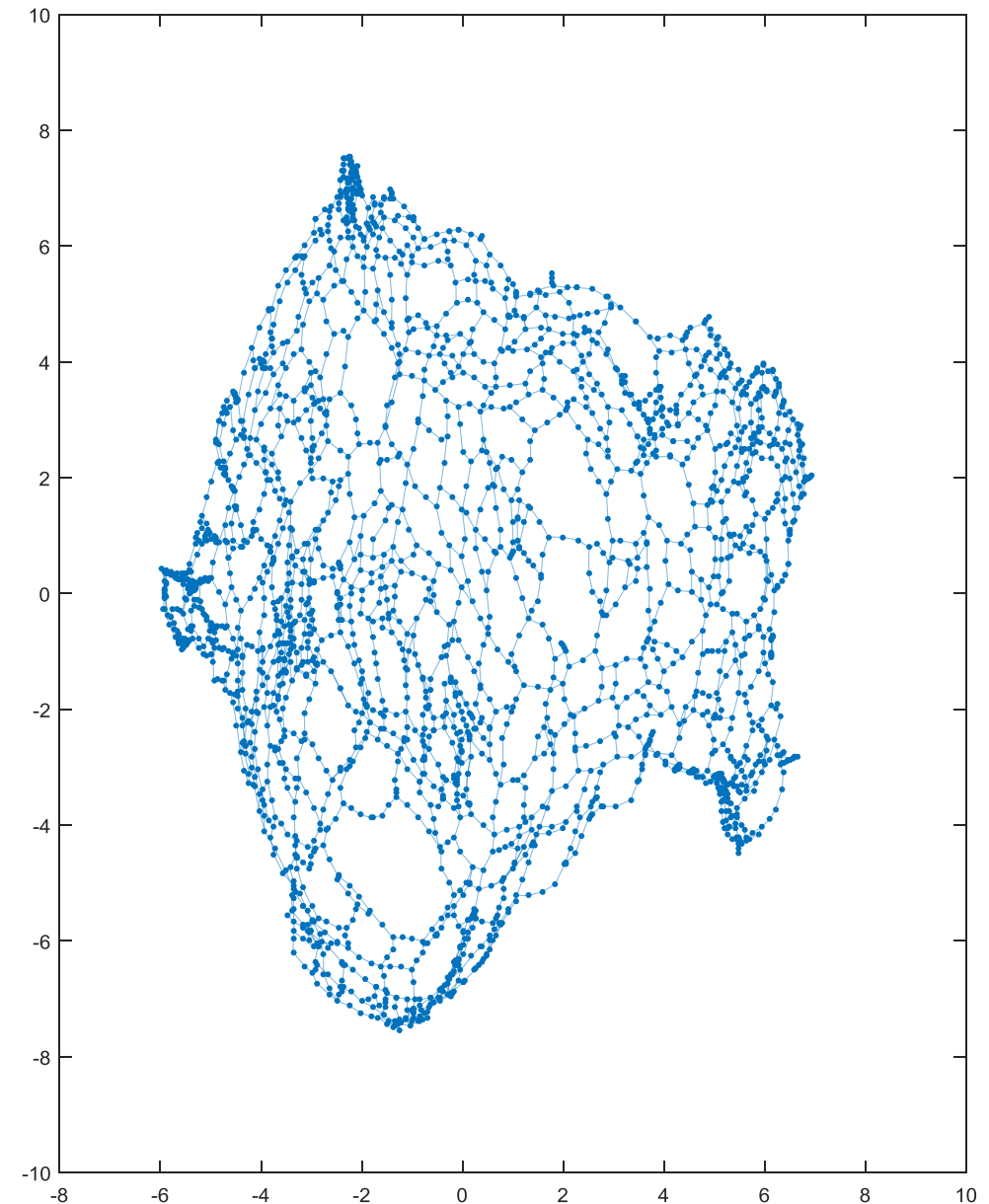
Plot a Graph

```
layout( P, 'force' );
```



Graphs in MATLAB

```
load('MinnesotaRoads');  
plot(G);
```



Graphs in MATLAB

```
G.Nodes( 1:7, : )
```

```
ans =
```

Longitude	Latitude
-----------	----------

-97.207	49.001
---------	--------

-96.801	49
---------	----

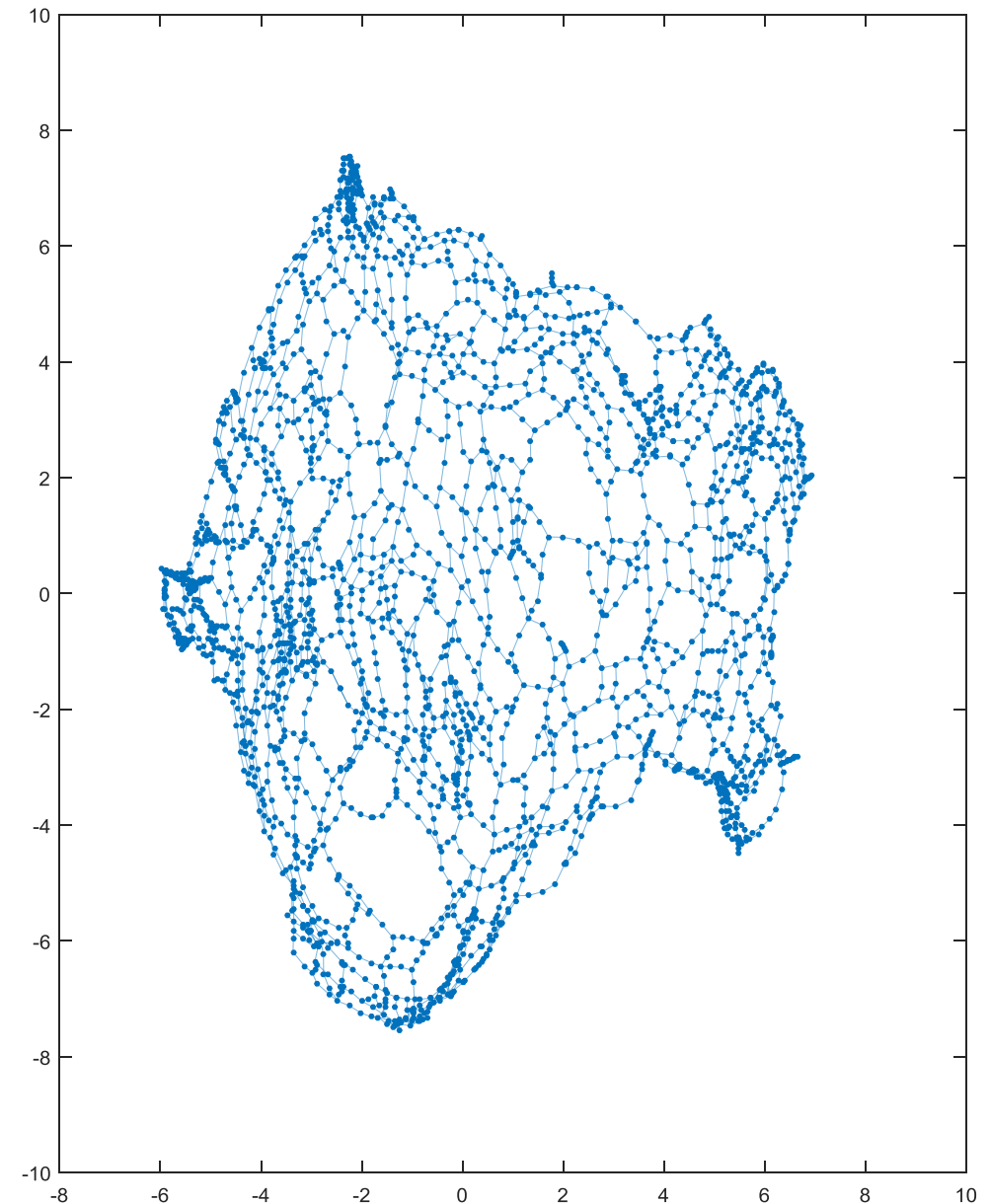
-95.957	49
---------	----

-95.931	49
---------	----

-95.766	49
---------	----

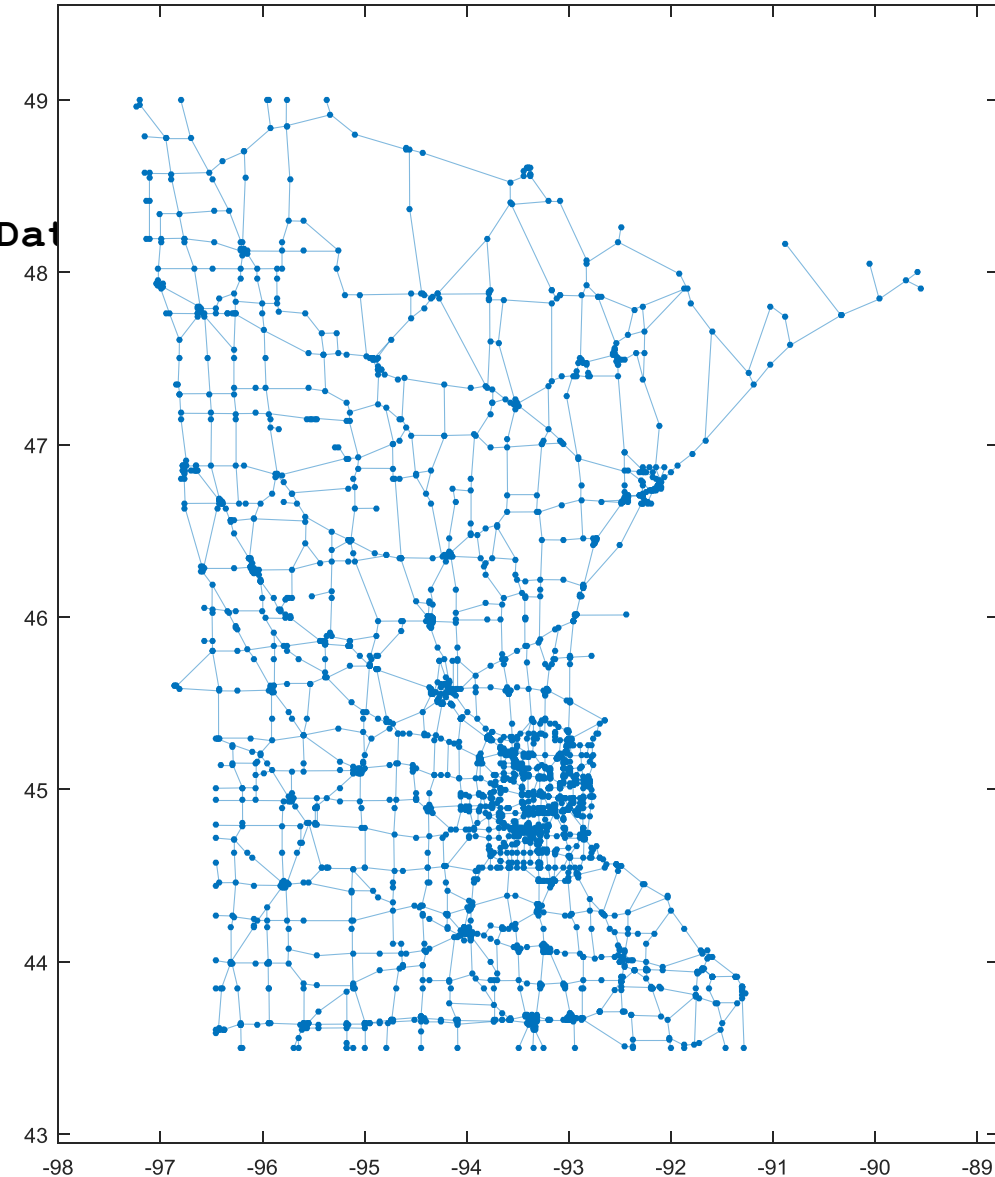
-95.378	48.999
---------	--------

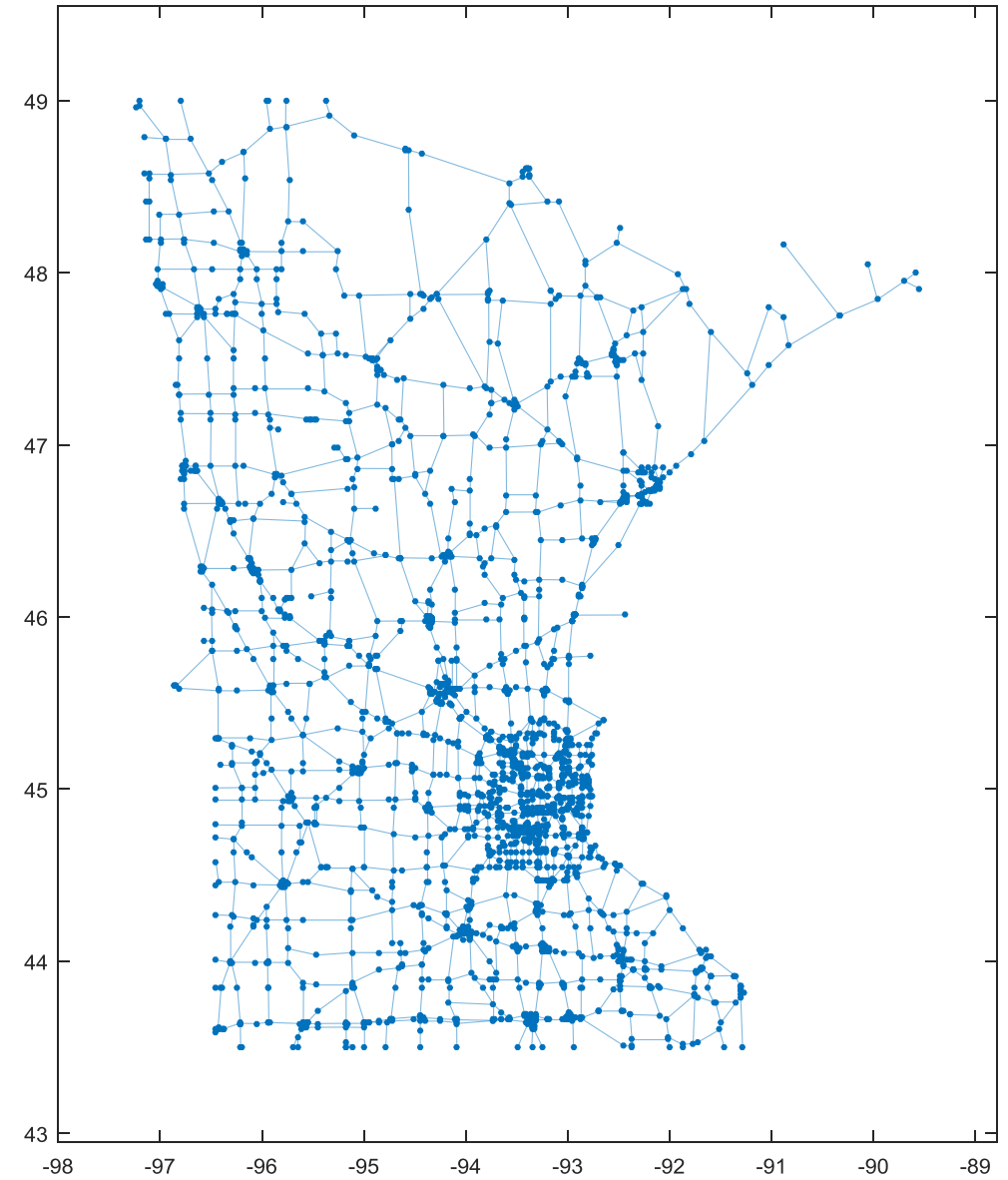
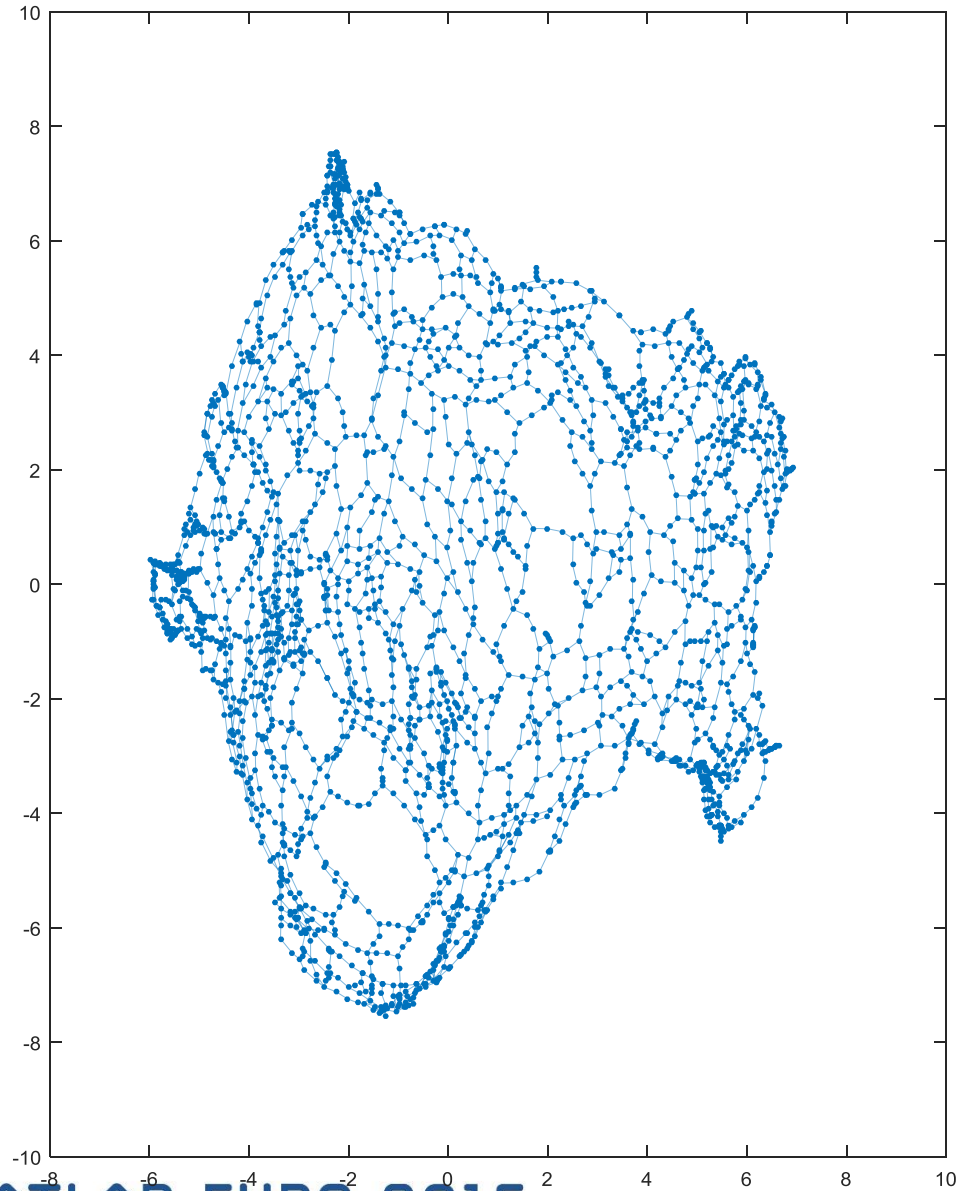
-97.2	48.972
-------	--------



Graphs in MATLAB

```
P = plot(G, 'xData', G.Nodes.Longitude, 'yData', G.Nodes.Latitude);
```





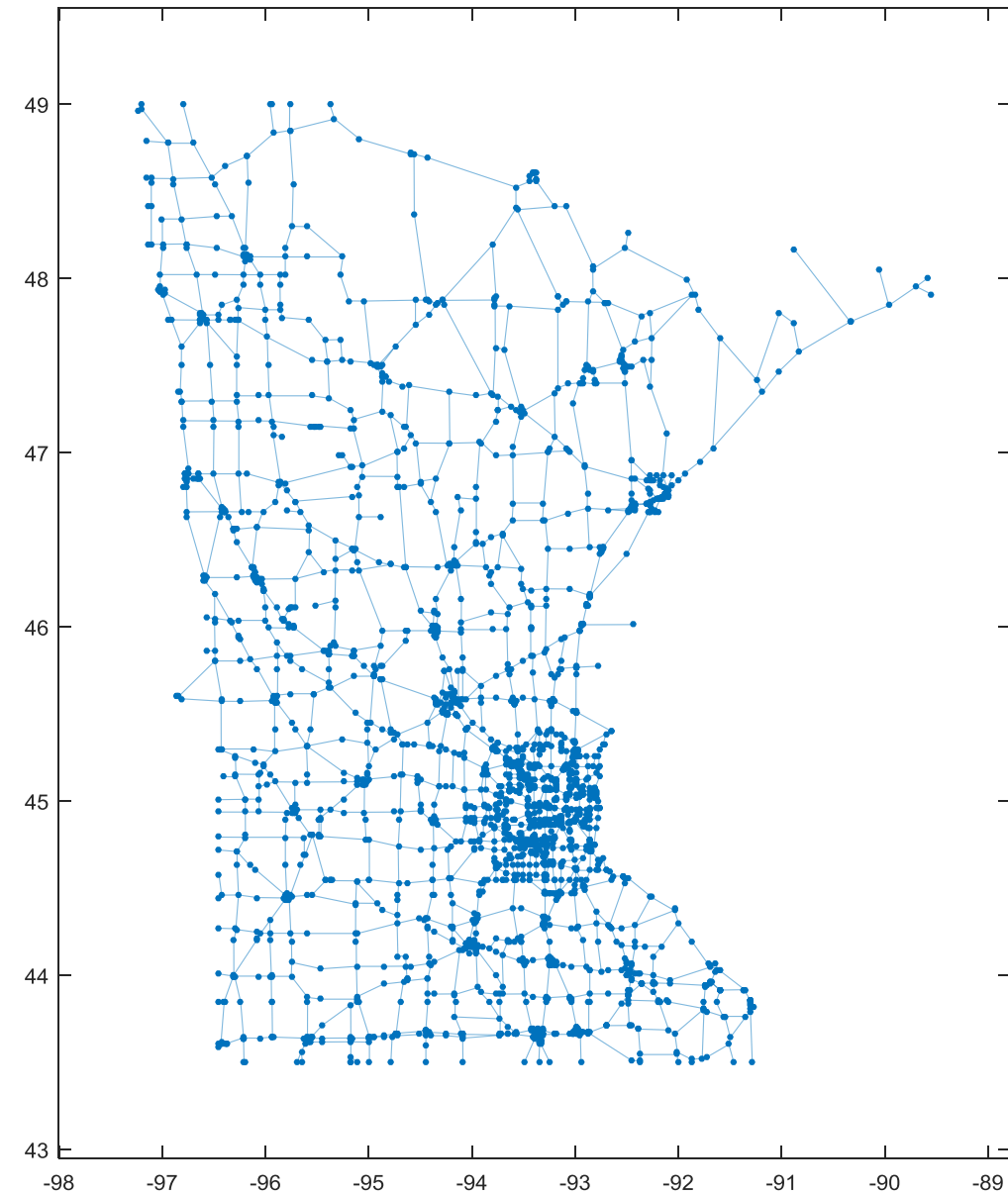
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Useful Graph Algorithms

<code>shortestpath</code>	Shortest path between two single nodes
<code>shortestpathtree</code>	Shortest path tree from node
<code>distances</code>	Shortest path distances of all node pairs
<code>bfsearch</code>	Breadth-first graph search
<code>dfsearch</code>	Depth-first graph search
<code>maxflow</code>	Maximum flow in graph
<code>conncomp</code>	Connected graph components
<code>minspantree</code>	Minimum spanning tree of graph
<code>toposort</code>	Topological order of directed acyclic graph
<code>isdag</code>	Determine if graph is acyclic
<code>transclosure</code>	Transitive closure
<code>transreduction</code>	Transitive reduction

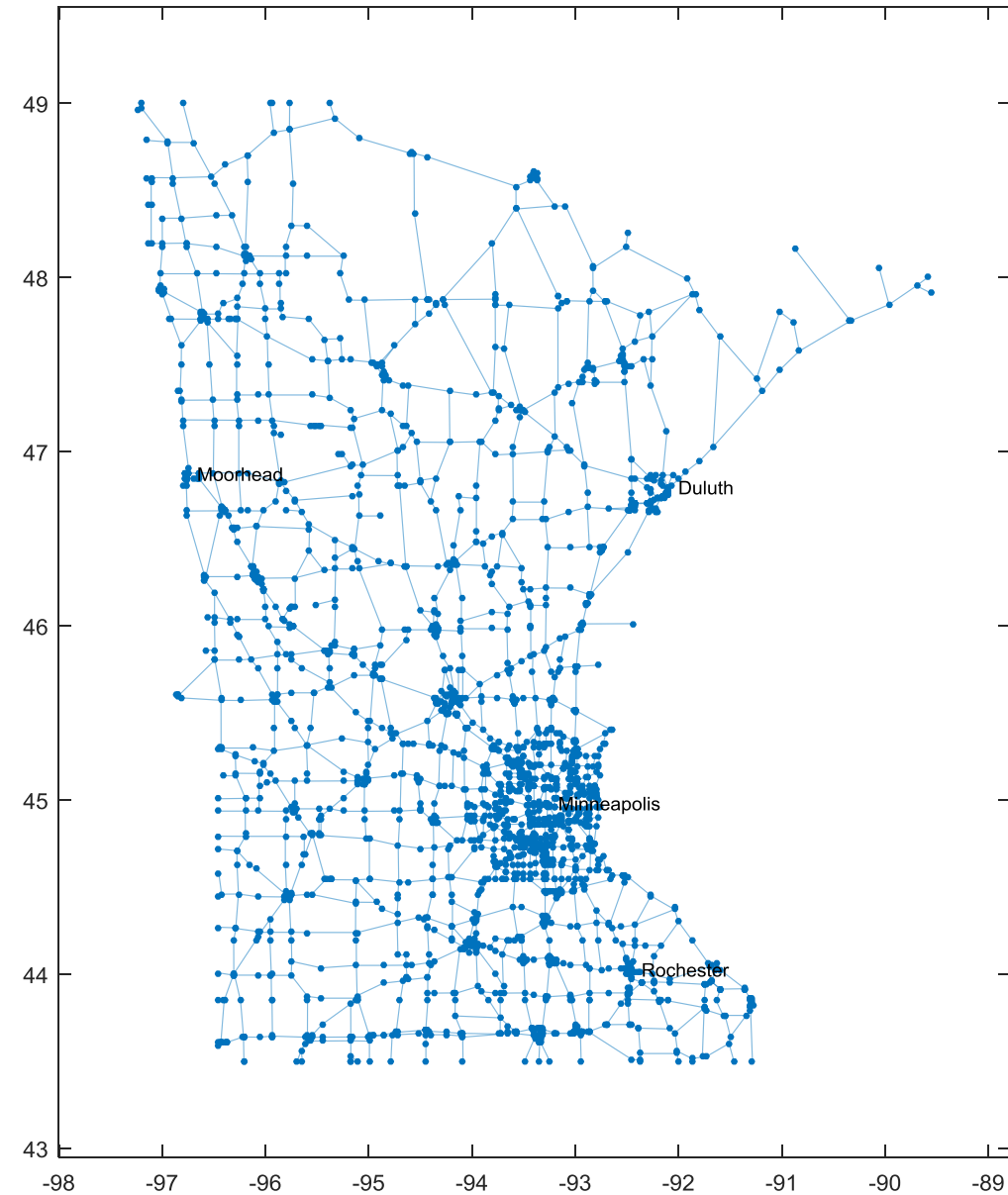
Graphs in MATLAB

```
P.labelnode(cityIDs, cityNames);
```



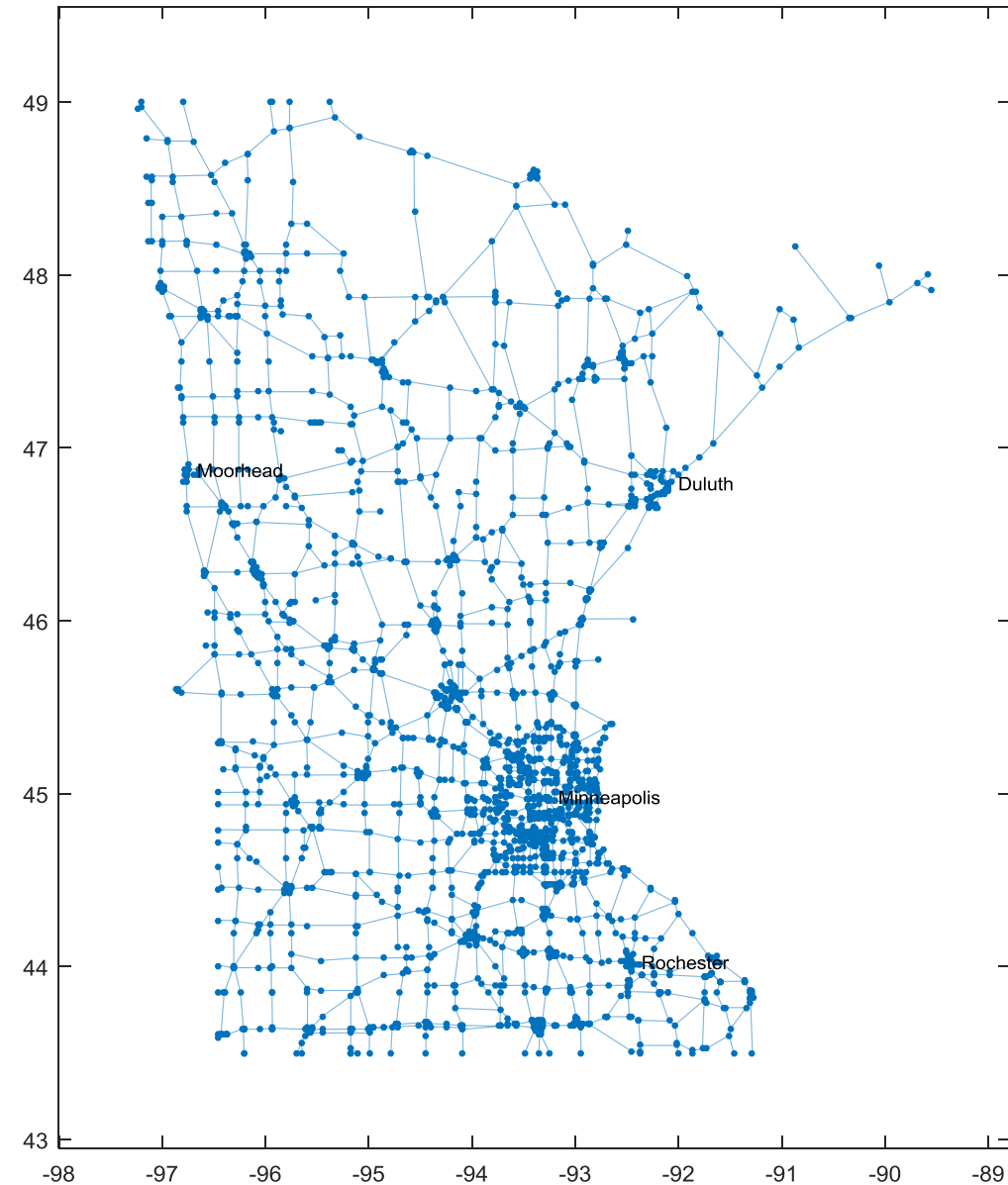
Graphs in MATLAB

```
P.labelnode(cityIDs, cityNames);
```



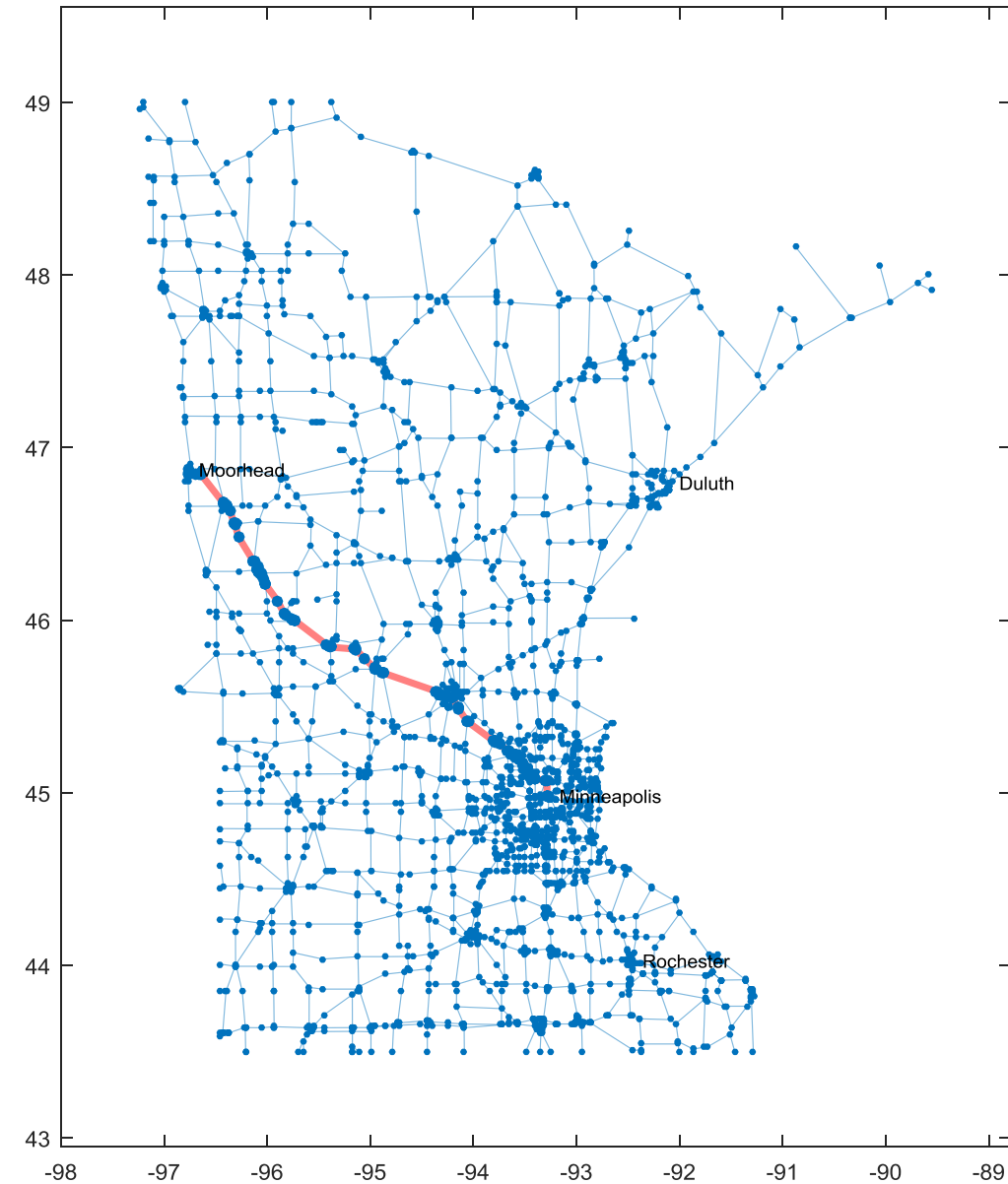
Graphs in MATLAB

```
T = shortestpath(G,Minneapolis,Moorhead);  
P.highlight(T,'EdgeColor','r');
```



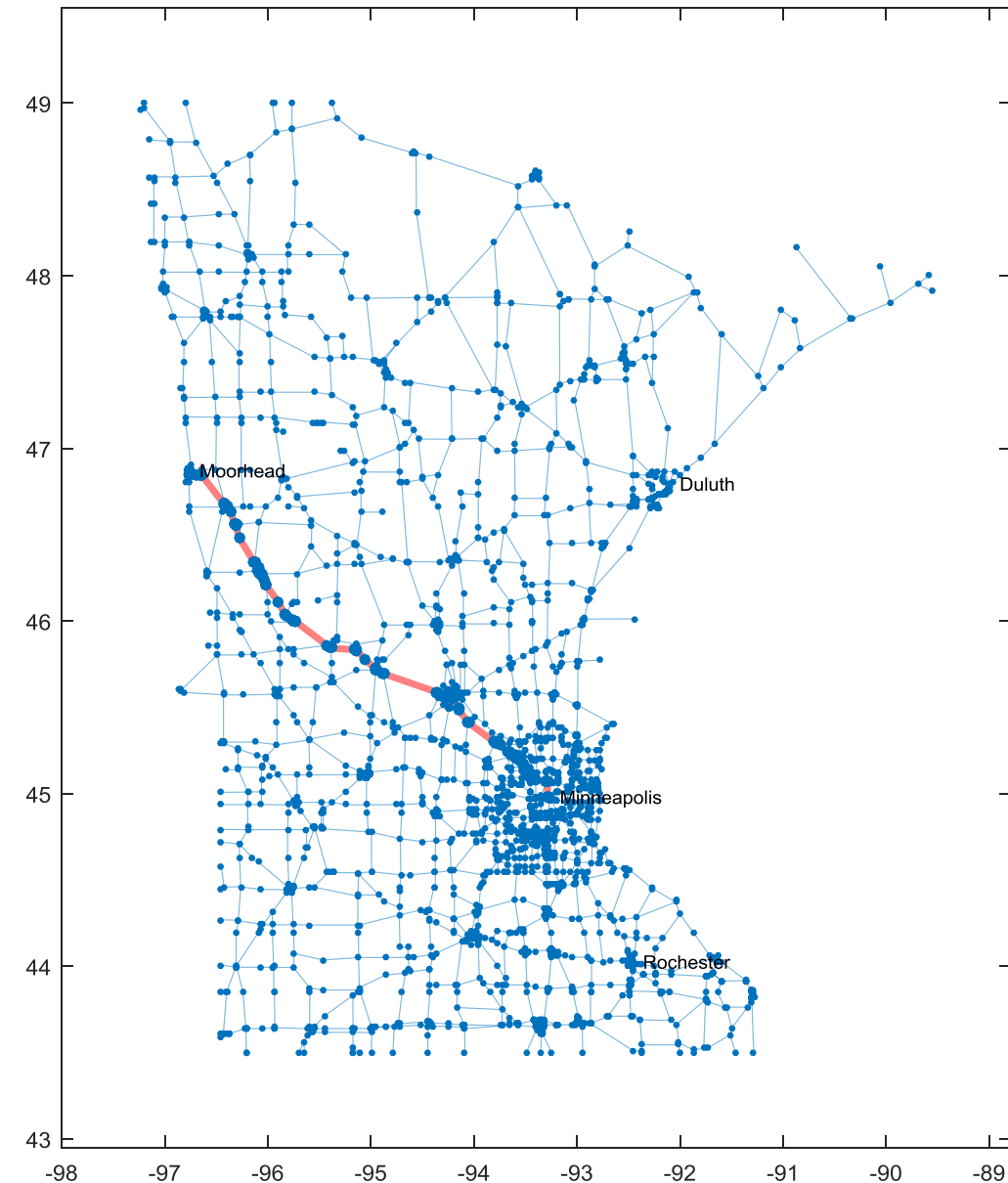
Graphs in MATLAB

```
T = shortestpath(G,Minneapolis,Moorhead);  
P.highlight(T,'EdgeColor','r');
```



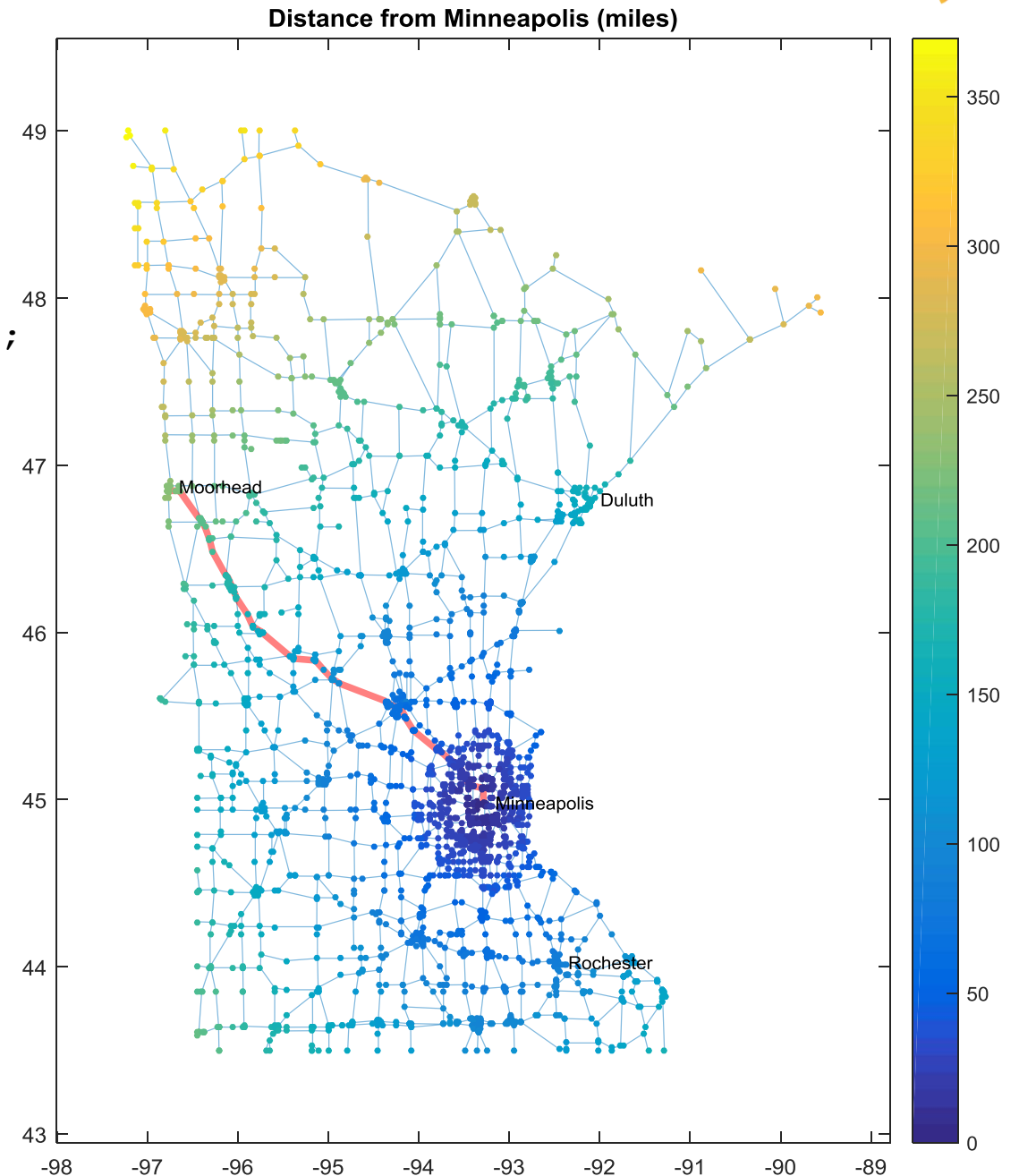
Graphs in MATLAB

```
P.NodeCData = distances(G, Minneapolis);  
title('Distance from Minneapolis (miles)');  
colorbar
```



Graphs in MATLAB

```
P.NodeCData = distances(G, Minneapolis);  
title('Distance from Minneapolis (miles)');  
colorbar
```



Minnesota gets a lot of snow.

You plow the snow

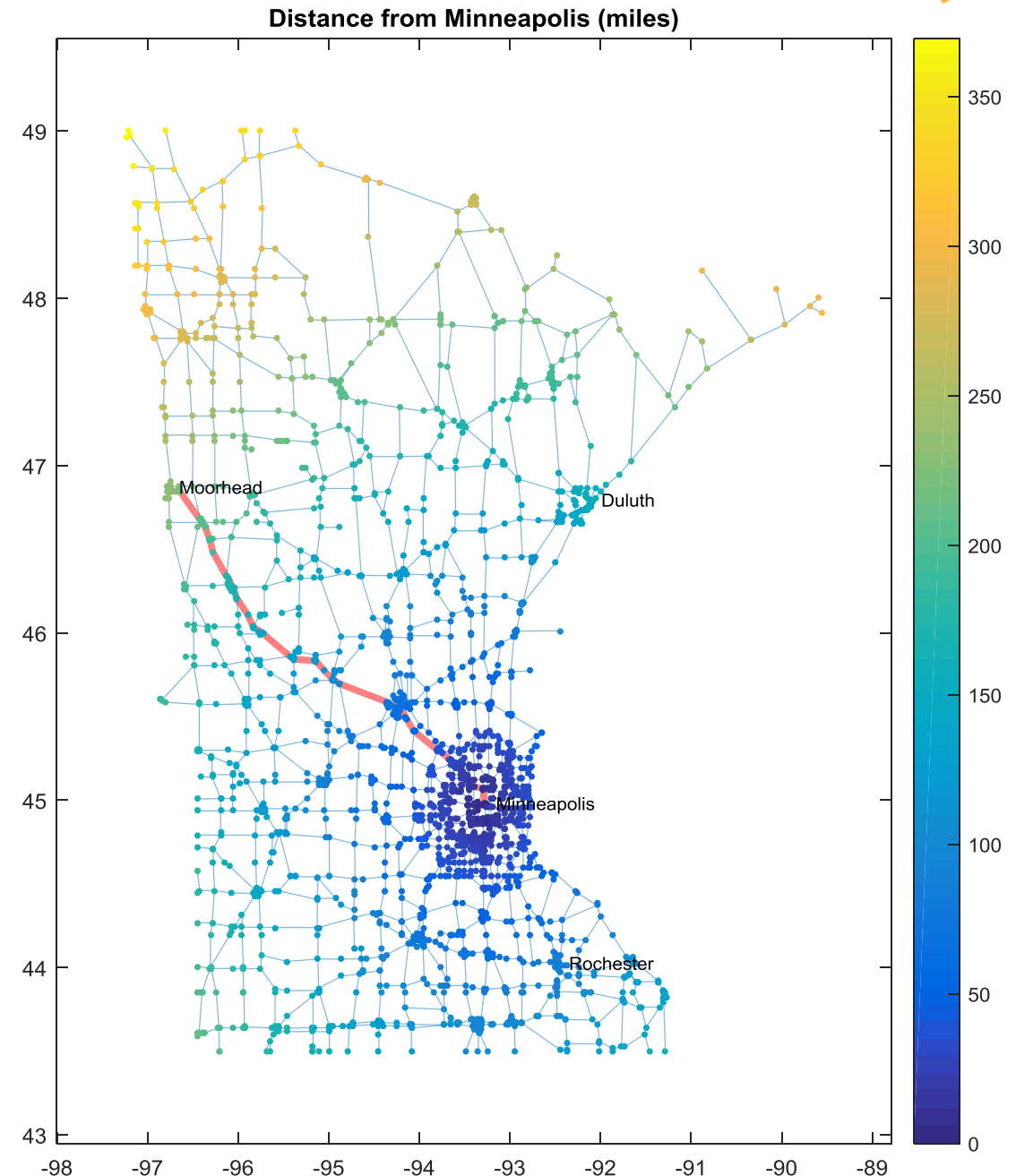
Your equipment is in Minneapolis

You don't have to plow every road

Drivers must be able to get from
every town to every other town

What is the least you must plow?

```
tree = minspantree(G,'root',minneapolis);  
highlight(P,tree, 'LineWidth', 3);
```



Minnesota gets a lot of snow.

You plow the snow

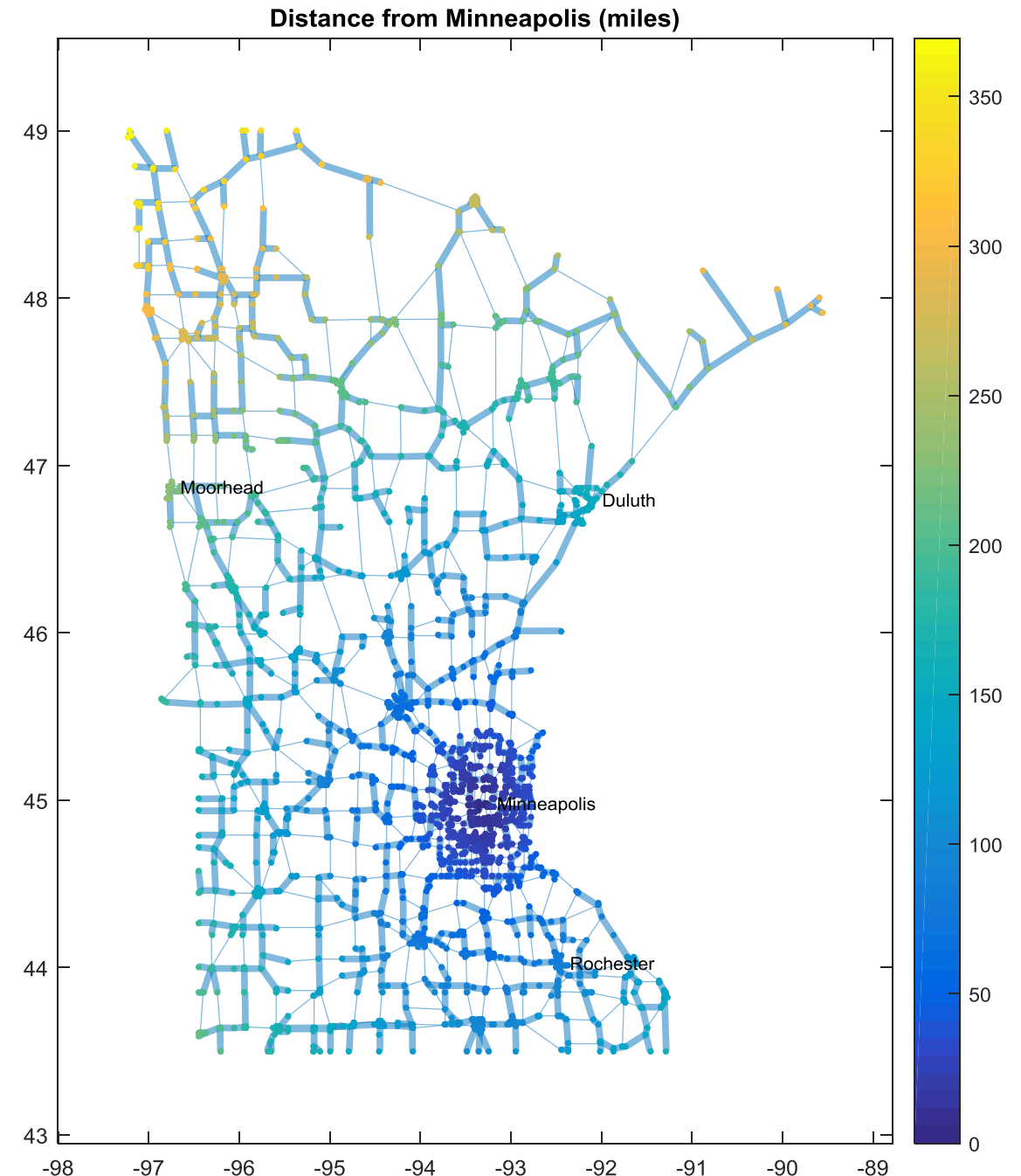
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Add-On Explorer

The File Exchange on
MATLAB Central

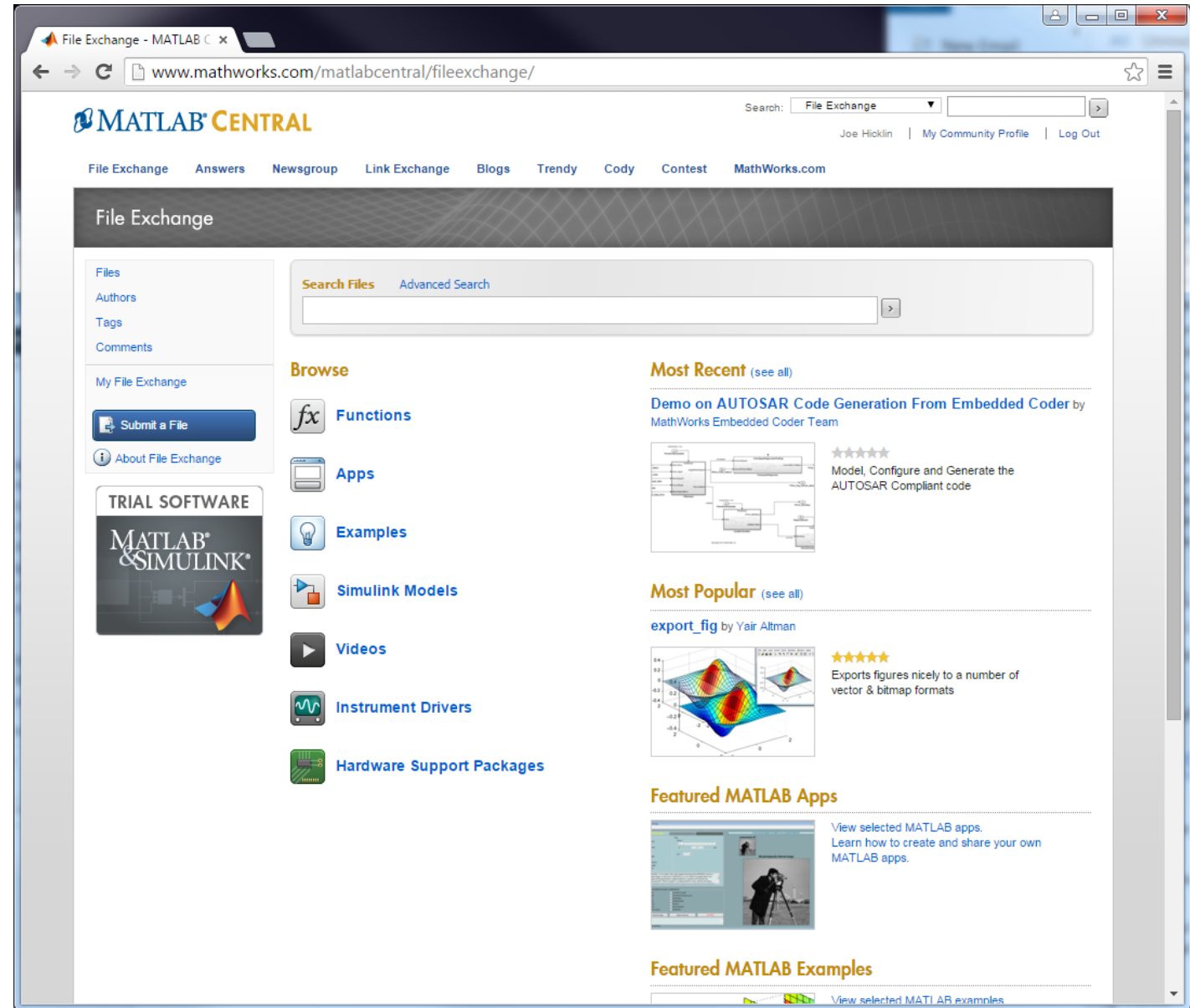
About 20,000 submissions

An underused resource

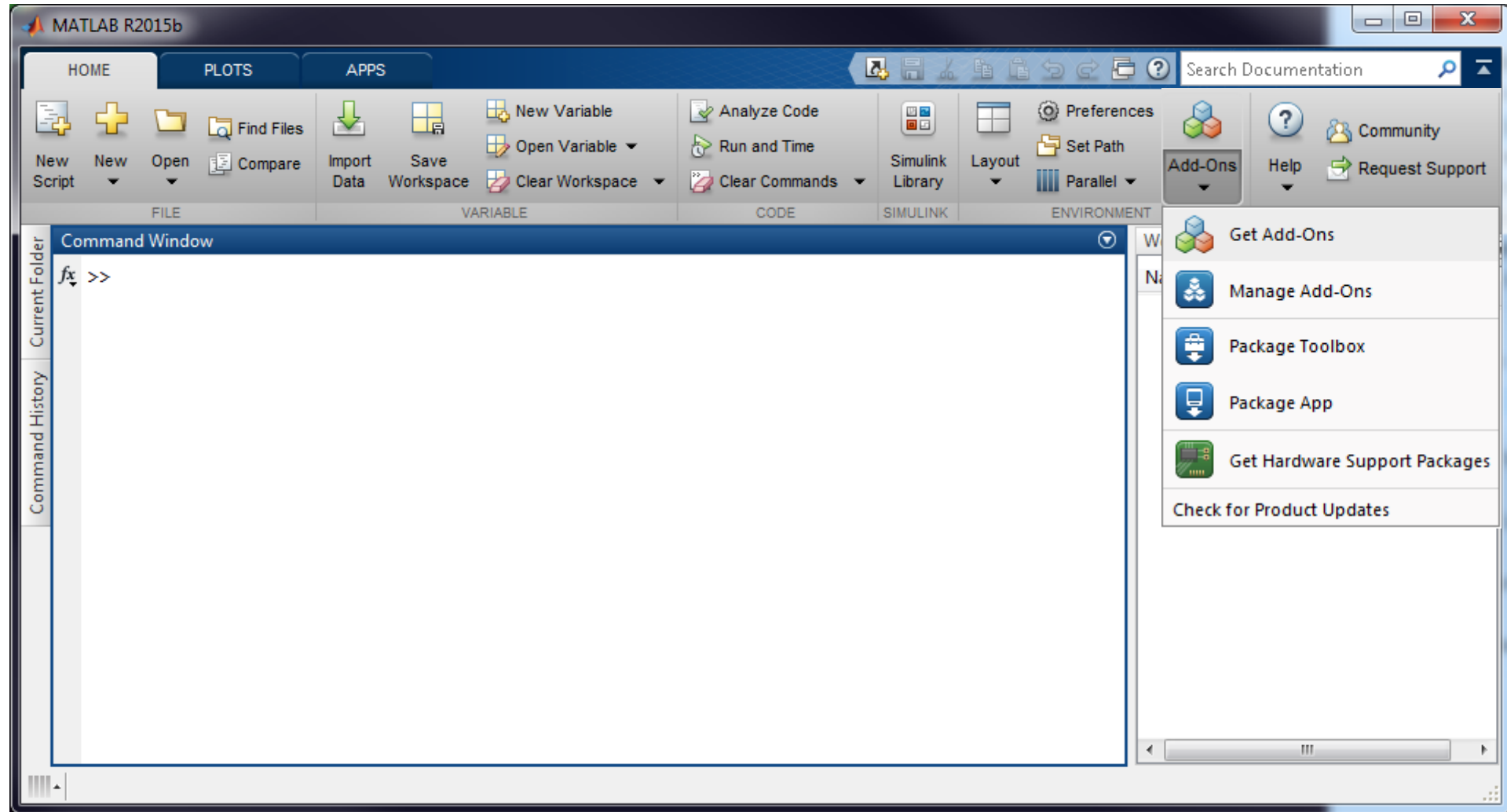
Awareness

Complexity

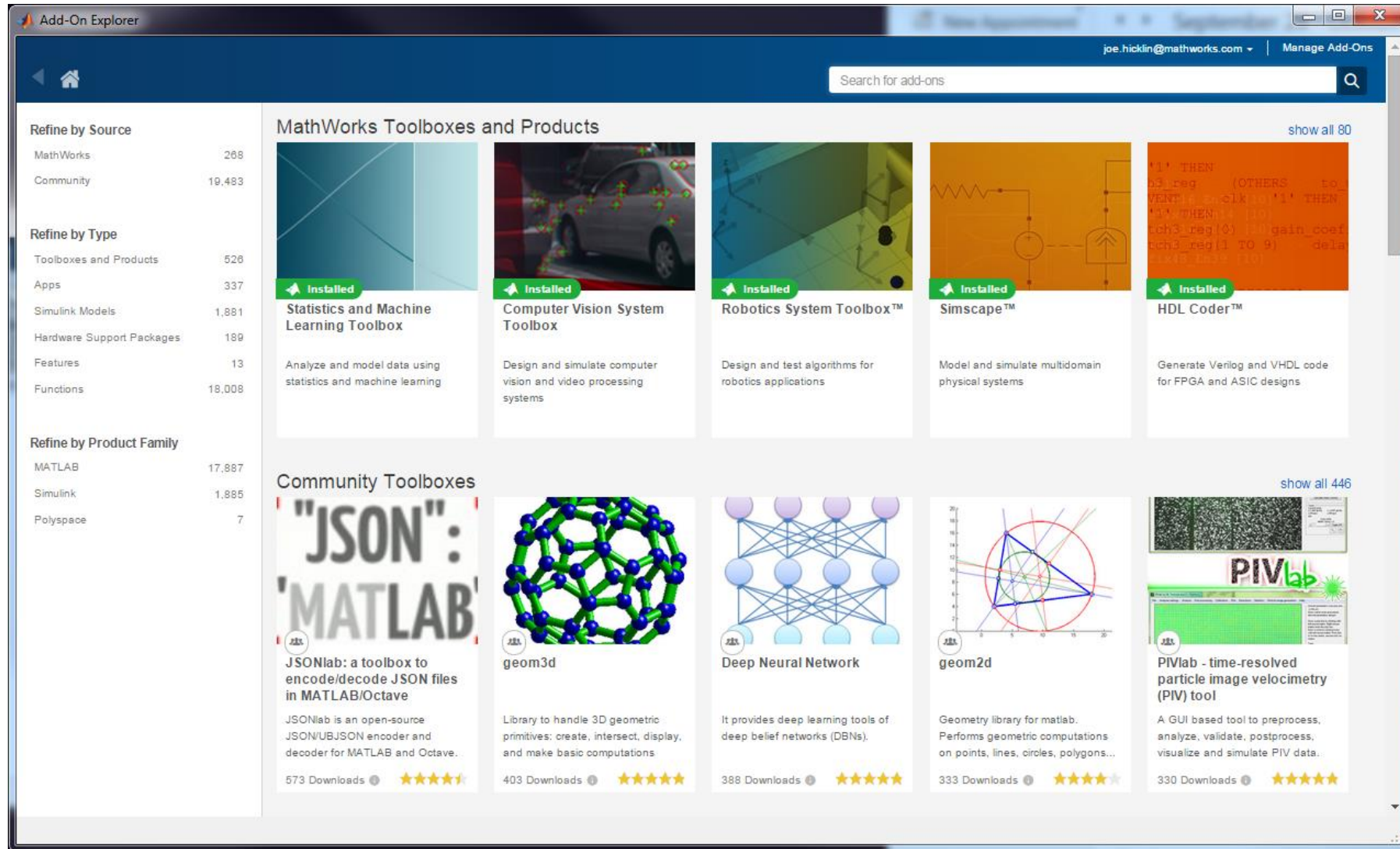
MATLAB EXPO 2015
UNITED KINGDOM



Add-On Explorer



Add-On Explorer

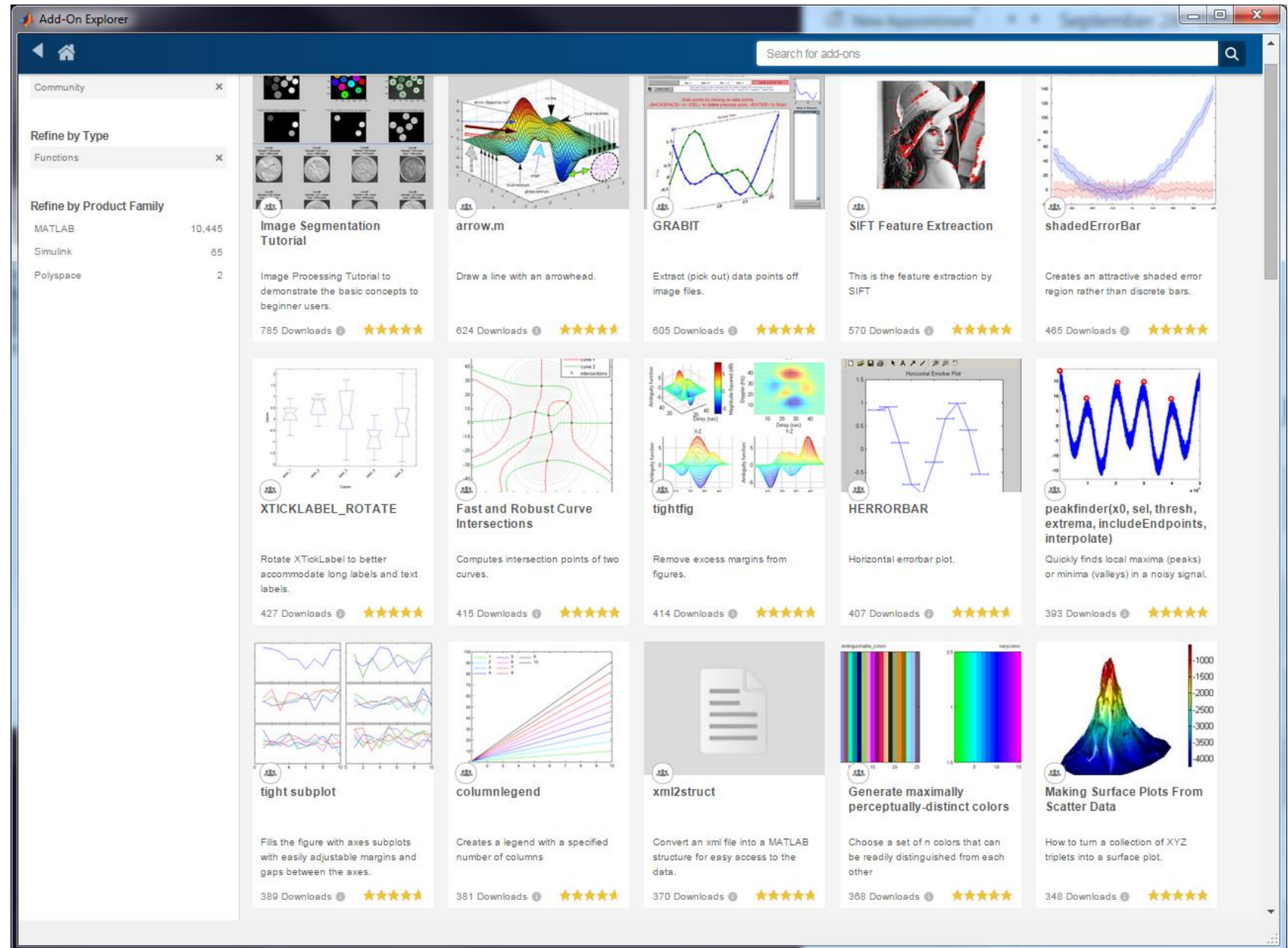


The screenshot displays the MATLAB Add-On Explorer window. The top navigation bar includes a search bar and a "Manage Add-Ons" link. The left sidebar provides filters for "Refine by Source" (MathWorks: 268, Community: 19,483) and "Refine by Type" (Toolboxes and Products: 526, Apps: 337, Simulink Models: 1,881, Hardware Support Packages: 189, Features: 13, Functions: 18,008). It also lists "Refine by Product Family" (MATLAB: 17,887, Simulink: 1,885, Polyspace: 7).

The main content area is divided into two sections:

- MathWorks Toolboxes and Products** (show all 80):
 - Statistics and Machine Learning Toolbox**: Analyze and model data using statistics and machine learning. (Installed)
 - Computer Vision System Toolbox**: Design and simulate computer vision and video processing systems. (Installed)
 - Robotics System Toolbox™**: Design and test algorithms for robotics applications. (Installed)
 - Simscape™**: Model and simulate multidomain physical systems. (Installed)
 - HDL Coder™**: Generate Verilog and VHDL code for FPGA and ASIC designs. (Installed)
- Community Toolboxes** (show all 446):
 - "JSON": "MATLAB"**: JSONlab: a toolbox to encode/decode JSON files in MATLAB/Octave. 573 Downloads, 5 stars.
 - geom3d**: Library to handle 3D geometric primitives; create, intersect, display, and make basic computations. 403 Downloads, 5 stars.
 - Deep Neural Network**: It provides deep learning tools of deep belief networks (DBNs). 388 Downloads, 5 stars.
 - geom2d**: Geometry library for matlab. Performs geometric computations on points, lines, circles, polygons... 333 Downloads, 5 stars.
 - PIVlab**: PIVlab - time-resolved particle image velocimetry (PIV) tool. 330 Downloads, 5 stars.

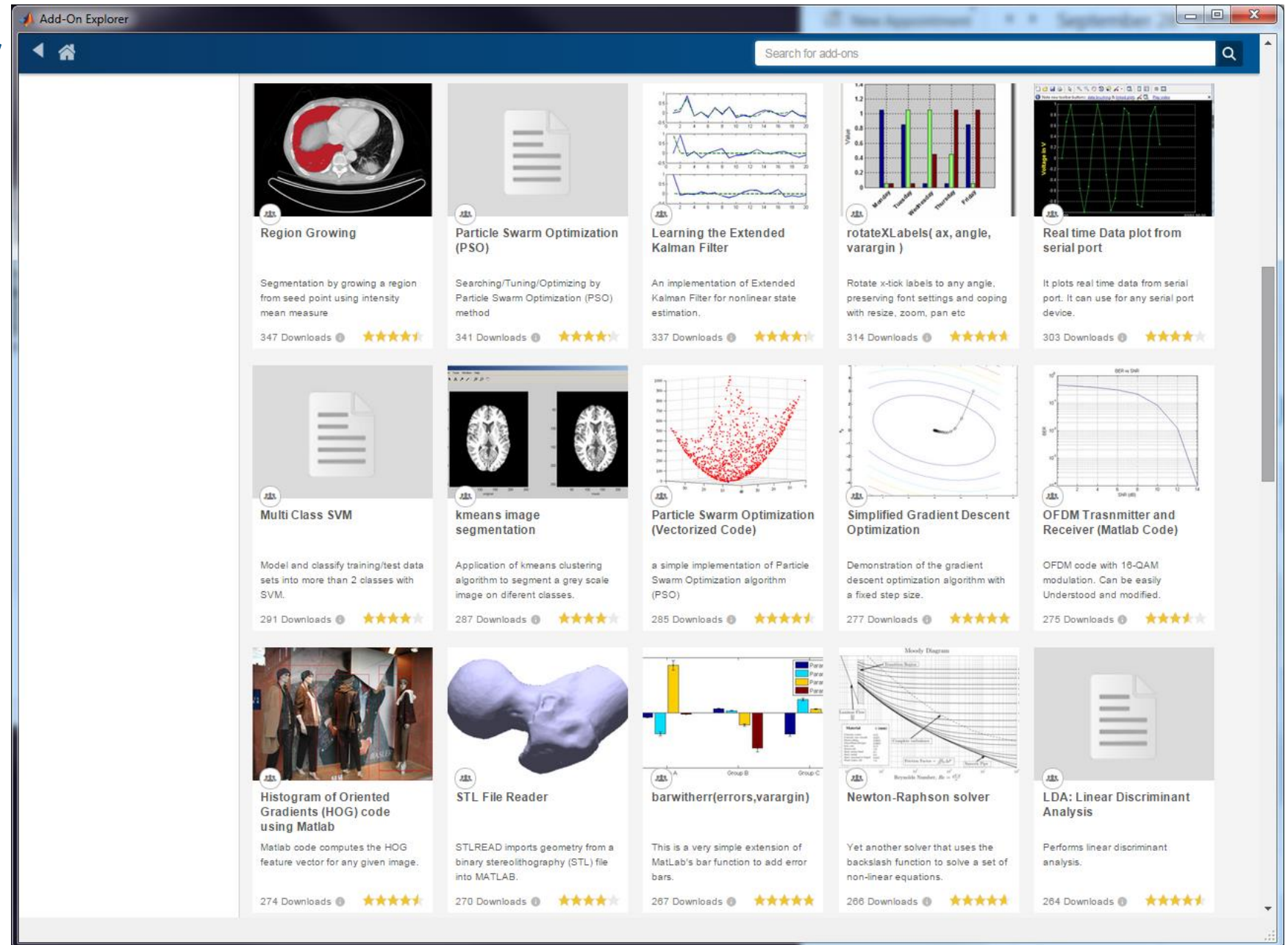
Add-On Explorer



The screenshot displays the MATLAB Add-On Explorer window. On the left, there is a sidebar with filters: 'Community', 'Refine by Type' (Functions), and 'Refine by Product Family' (MATLAB: 10,445; Simulink: 65; Polyspace: 2). The main area shows a grid of add-on cards, each with a thumbnail, title, description, and download statistics.

Add-on Name	Description	Downloads	Rating
Image Segmentation Tutorial	Image Processing Tutorial to demonstrate the basic concepts to beginner users.	785	5 stars
arrow.m	Draw a line with an arrowhead.	624	5 stars
GRABIT	Extract (pick out) data points off image files.	605	5 stars
SIFT Feature Extraction	This is the feature extraction by SIFT	570	5 stars
shadedErrorBar	Creates an attractive shaded error region rather than discrete bars.	485	5 stars
XTICKLABEL_ROTATE	Rotate XTickLabel to better accommodate long labels and text labels.	427	5 stars
Fast and Robust Curve Intersections	Computes intersection points of two curves.	415	5 stars
tightfig	Remove excess margins from figures.	414	5 stars
HERRORBAR	Horizontal errorbar plot.	407	5 stars
peakfinder(x0, sel, thresh, extrema, includeEndpoints, interpolate)	Quickly finds local maxima (peaks) or minima (valleys) in a noisy signal.	393	5 stars
tight subplot	Fills the figure with axes subplots with easily adjustable margins and gaps between the axes.	389	5 stars
columnlegend	Creates a legend with a specified number of columns	381	5 stars
xml2struct	Convert an xml file into a MATLAB structure for easy access to the data.	370	5 stars
Generate maximally perceptually-distinct colors	Choose a set of n colors that can be readily distinguished from each other	368	5 stars
Making Surface Plots From Scatter Data	How to turn a collection of XYZ triplets into a surface plot.	348	5 stars

Add-On Explorer



The screenshot shows the MATLAB Add-On Explorer interface. At the top, there is a search bar labeled "Search for add-ons". Below the search bar, a grid of 15 add-on cards is displayed. Each card features a thumbnail image, the add-on name, a brief description, the number of downloads, and a star rating.

Add-on Name	Description	Downloads	Rating
Region Growing	Segmentation by growing a region from seed point using intensity mean measure	347	★★★★★
Particle Swarm Optimization (PSO)	Searching/Tuning/Optimizing by Particle Swarm Optimization (PSO) method	341	★★★★★
Learning the Extended Kalman Filter	An implementation of Extended Kalman Filter for nonlinear state estimation.	337	★★★★★
rotateXLabels(ax, angle, varargin)	Rotate x-tick labels to any angle, preserving font settings and coping with resize, zoom, pan etc	314	★★★★★
Real time Data plot from serial port	It plots real time data from serial port. It can use for any serial port device.	303	★★★★★
Multi Class SVM	Model and classify training/test data sets into more than 2 classes with SVM.	291	★★★★★
kmeans image segmentation	Application of kmeans clustering algorithm to segment a grey scale image on different classes.	287	★★★★★
Particle Swarm Optimization (Vectorized Code)	a simple implementation of Particle Swarm Optimization algorithm (PSO)	285	★★★★★
Simplified Gradient Descent Optimization	Demonstration of the gradient descent optimization algorithm with a fixed step size.	277	★★★★★
OFDM Transmitter and Receiver (Matlab Code)	OFDM code with 16-QAM modulation. Can be easily Understood and modified.	275	★★★★★
Histogram of Oriented Gradients (HOG) code using Matlab	Matlab code computes the HOG feature vector for any given image.	274	★★★★★
STL File Reader	STLREAD imports geometry from a binary stereolithography (STL) file into MATLAB.	270	★★★★★
barwitherr(errors,varargin)	This is a very simple extension of MatLab's bar function to add error bars.	267	★★★★★
Newton-Raphson solver	Yet another solver that uses the backlash function to solve a set of non-linear equations.	266	★★★★★
LDA: Linear Discriminant Analysis	Performs linear discriminant analysis.	264	★★★★★



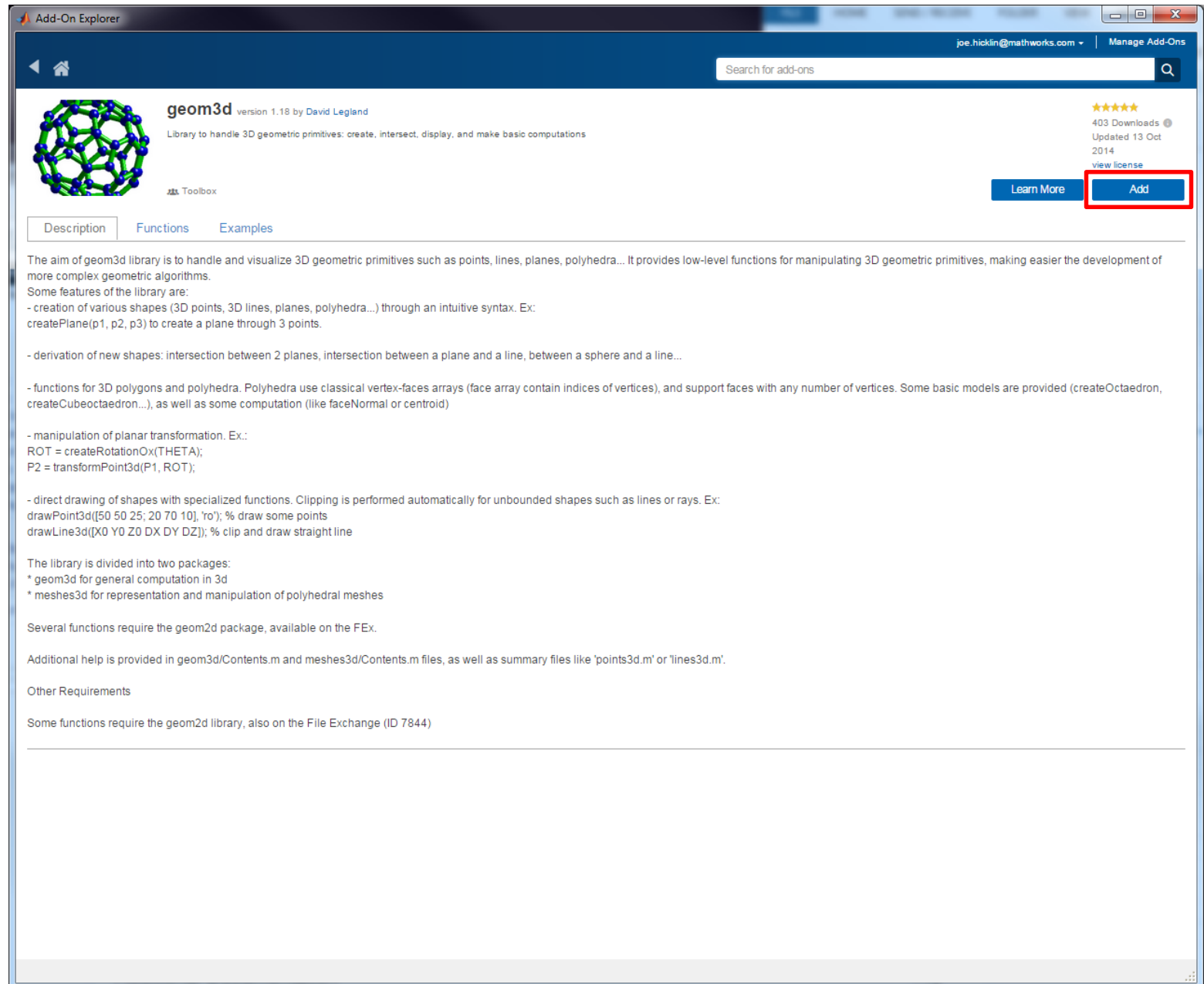
Add-On Explorer

The screenshot displays the MATLAB Add-On Explorer interface, which is organized into several sections:

- Refine by Source:** A sidebar on the left with a search bar and a list of sources: Community (446), Toolboxes and Products (304), Apps (1,881), Hardware Support Packages (14), and Functions (17,931).
- Refine by Type:** A sidebar on the left with a list of product families: MATLAB (17,670), Simulink (1,810), and Polyspace (3).
- Community Toolboxes:** A grid of toolbox cards. The 'geom3d' toolbox is highlighted with a red border. Other toolboxes include 'JSONlab', 'Deep Neural Network', 'geom2d', and 'PIVlab'.
- Community Apps:** A grid of app cards. Apps include 'Flappy Bird for MATLAB', 'SegmentTool: An Interactive GUI for Segmenting Images', 'Image Morphology', 'Cascade Trainer: Specify Ground Truth, Train a Detector', and 'GPUBench'.
- Community Simulink Models:** A grid of Simulink model cards. Models include 'A PHOTOVOLTAIC PANEL MODEL IN MATLAB/SIMULINK', 'Grid-Connected PV Array', 'Simulink model of Photovoltaic Module', 'MPPT based Photovoltaic (PV) system', and 'Perturb and Observe (P&O) Algorithm for PV MPPT'.

Each card in the grid displays a thumbnail image, the name of the add-on, a brief description, the number of downloads, and a star rating.

Add-On Explorer



The screenshot shows the MATLAB Add-On Explorer interface. At the top, there's a search bar and a 'Manage Add-Ons' link. The main content area displays the 'geom3d' add-on, version 1.18 by David Legland. It includes a 3D molecular model icon, a 'Toolbox' label, and a star rating of 4.5 stars with 403 downloads. The 'Add' button is highlighted with a red rectangle. Below the add-on details, there are tabs for 'Description', 'Functions', and 'Examples'. The 'Description' tab is active, showing the aim of the library and its features. The 'Functions' tab is also visible. The 'Examples' tab is not active. The 'Description' text includes a list of features and a list of functions. The 'Functions' tab shows a list of functions. The 'Examples' tab shows a list of examples.

geom3d version 1.18 by David Legland
Library to handle 3D geometric primitives: create, intersect, display, and make basic computations

403 Downloads
Updated 13 Oct 2014
[view license](#)

[Learn More](#) [Add](#)

Description **Functions** **Examples**

The aim of geom3d library is to handle and visualize 3D geometric primitives such as points, lines, planes, polyhedra... It provides low-level functions for manipulating 3D geometric primitives, making easier the development of more complex geometric algorithms.

Some features of the library are:

- creation of various shapes (3D points, 3D lines, planes, polyhedra...) through an intuitive syntax. Ex: `createPlane(p1, p2, p3)` to create a plane through 3 points.
- derivation of new shapes: intersection between 2 planes, intersection between a plane and a line, between a sphere and a line...
- functions for 3D polygons and polyhedra. Polyhedra use classical vertex-faces arrays (face array contain indices of vertices), and support faces with any number of vertices. Some basic models are provided (`createOctaedron`, `createCubeoctaedron...`), as well as some computation (like `faceNormal` or `centroid`)
- manipulation of planar transformation. Ex.:
`ROT = createRotationOx(THETA);`
`P2 = transformPoint3d(P1, ROT);`
- direct drawing of shapes with specialized functions. Clipping is performed automatically for unbounded shapes such as lines or rays. Ex:
`drawPoint3d([50 50 25; 20 70 10], 'ro'); % draw some points`
`drawLine3d([X0 Y0 Z0 DX DY DZ]); % clip and draw straight line`

The library is divided into two packages:

- * `geom3d` for general computation in 3d
- * `meshes3d` for representation and manipulation of polyhedral meshes

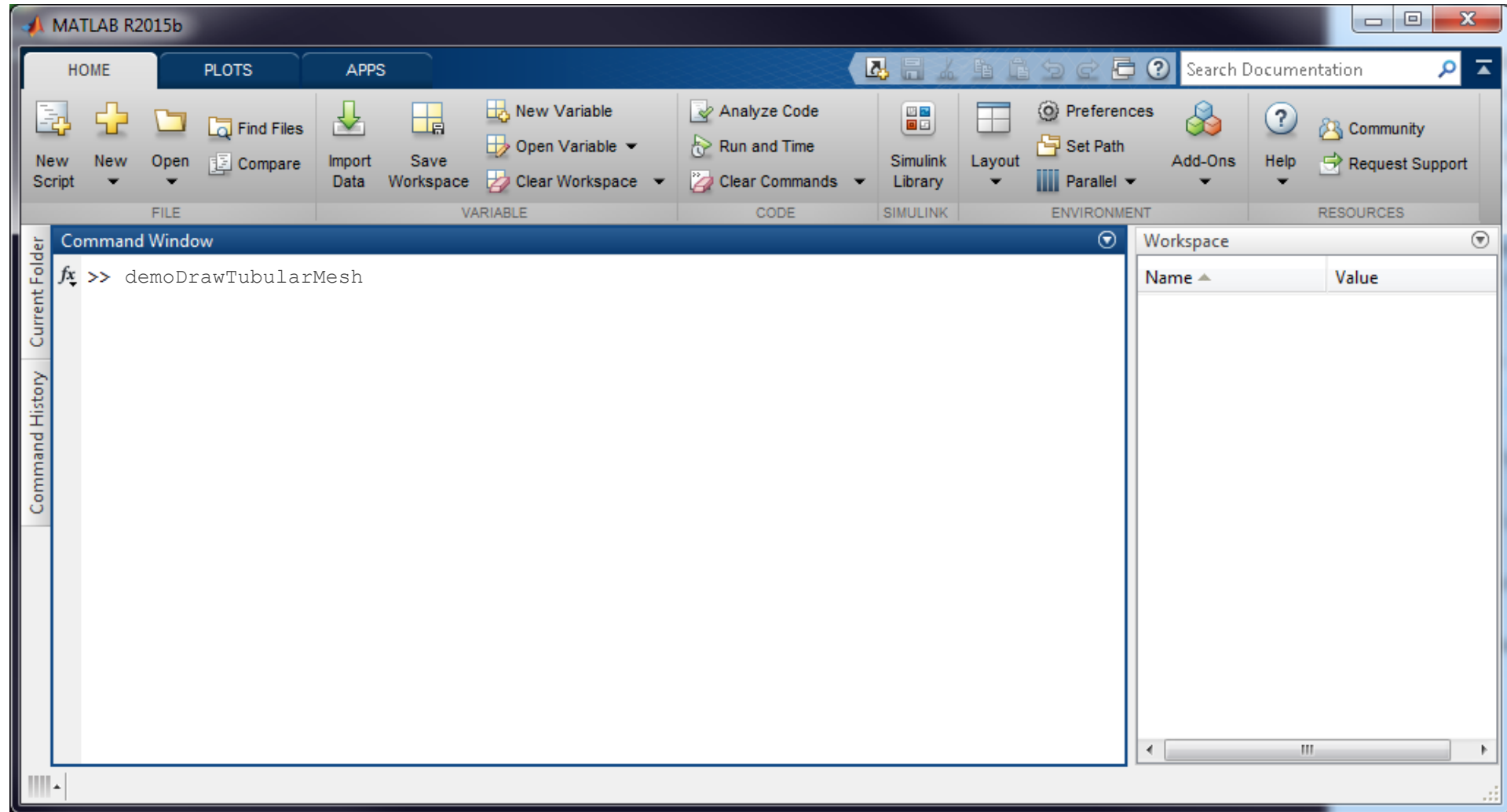
Several functions require the `geom2d` package, available on the FE.

Additional help is provided in `geom3d/Contents.m` and `meshes3d/Contents.m` files, as well as summary files like 'points3d.m' or 'lines3d.m'.

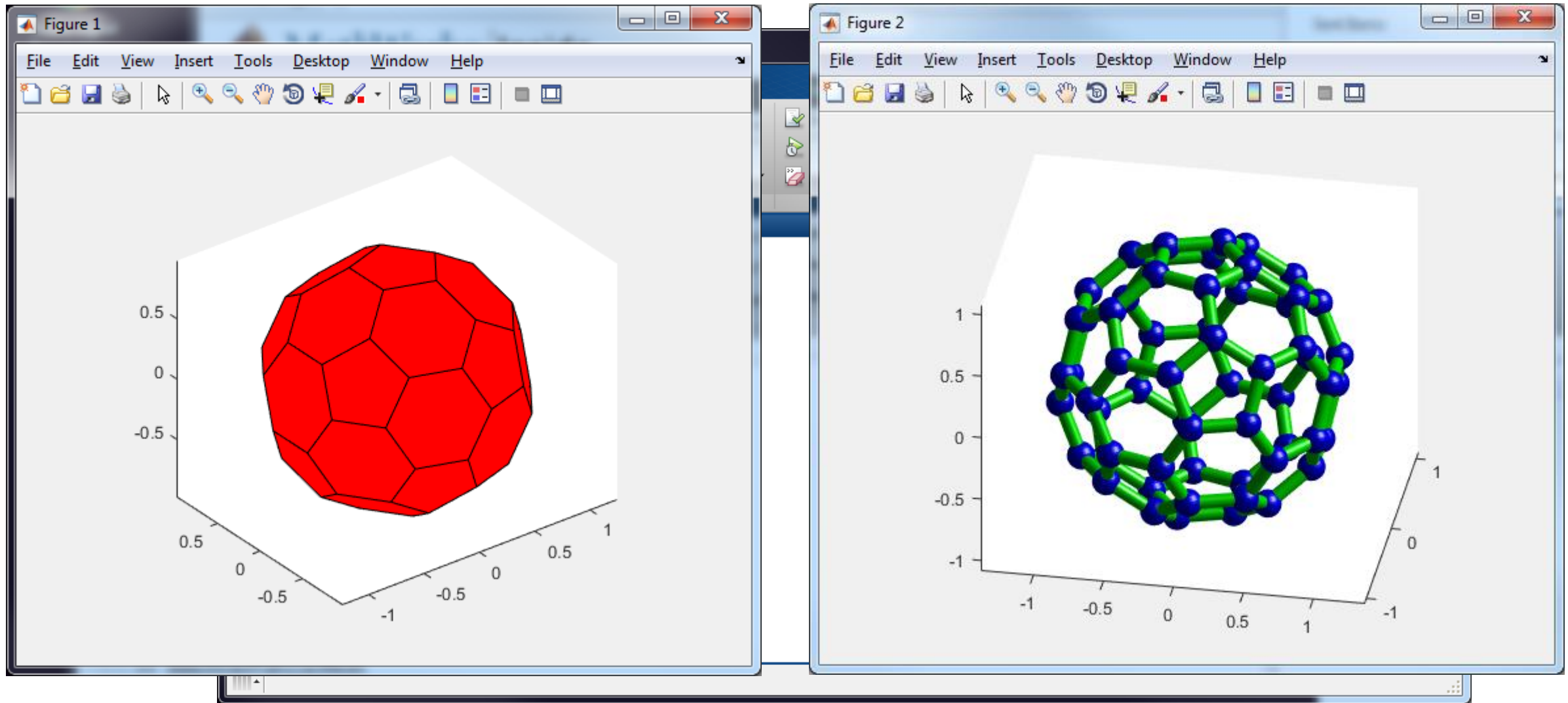
Other Requirements

Some functions require the `geom2d` library, also on the File Exchange (ID 7844)

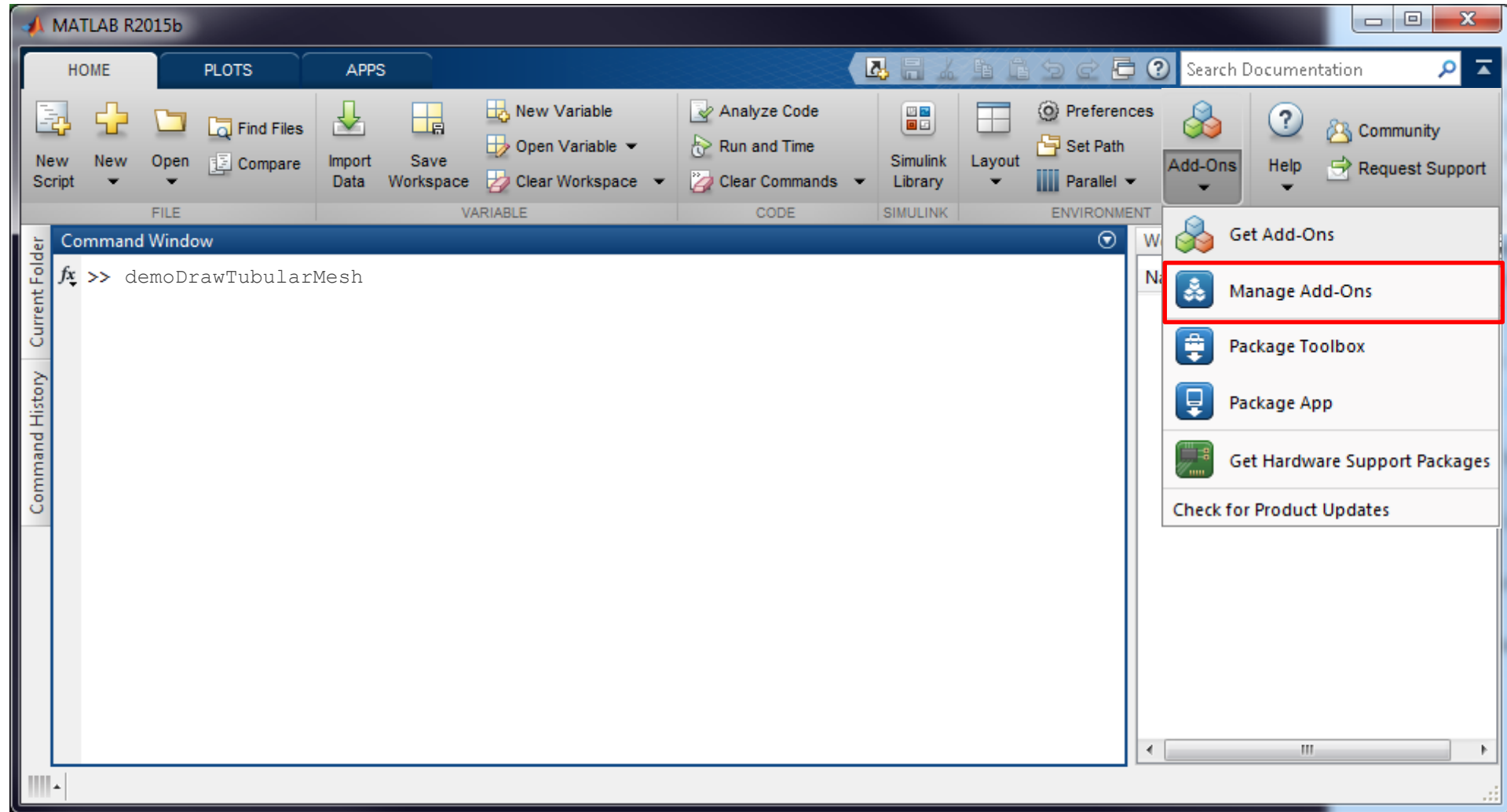
Add-On Manager



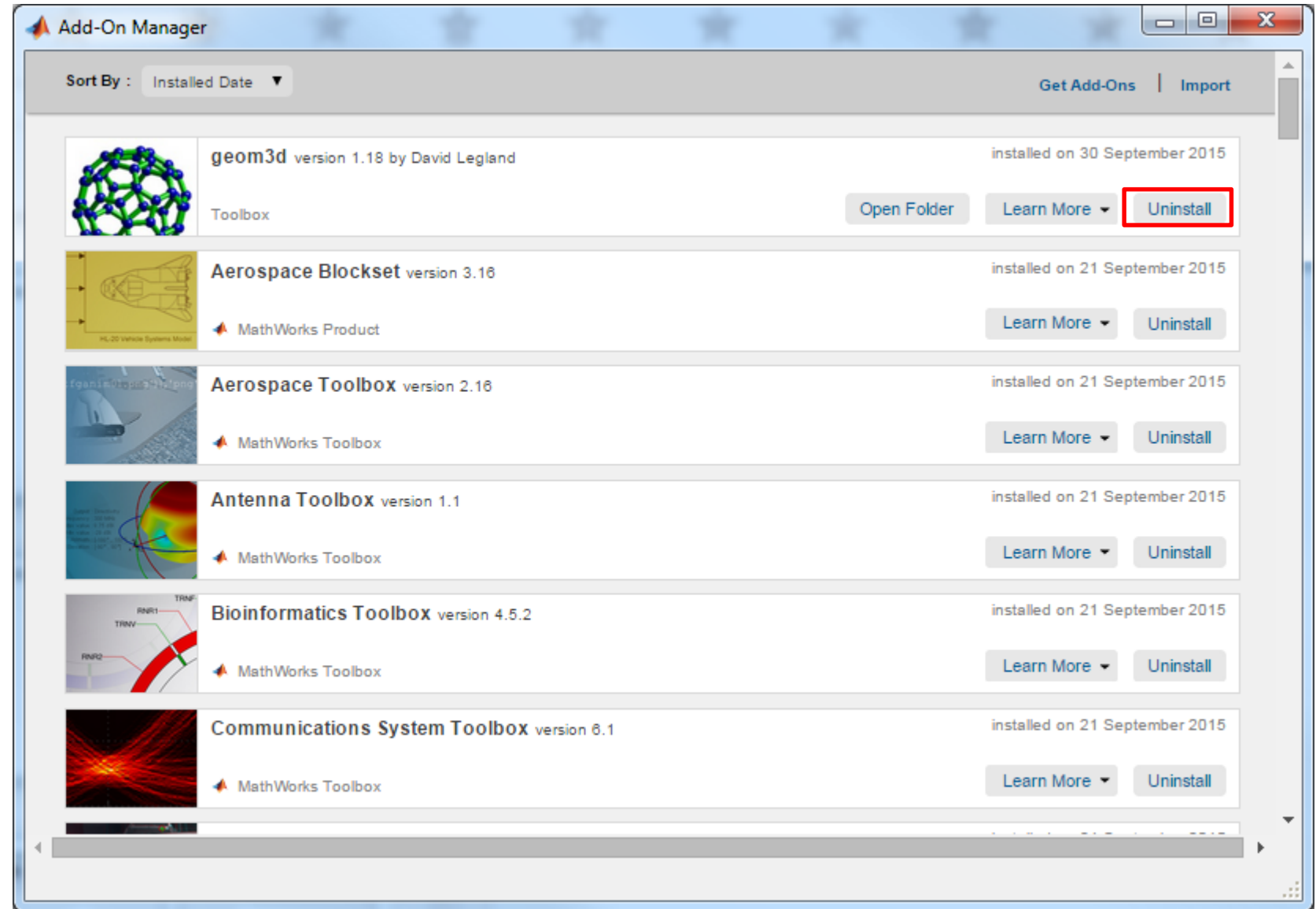
Add-On Explorer



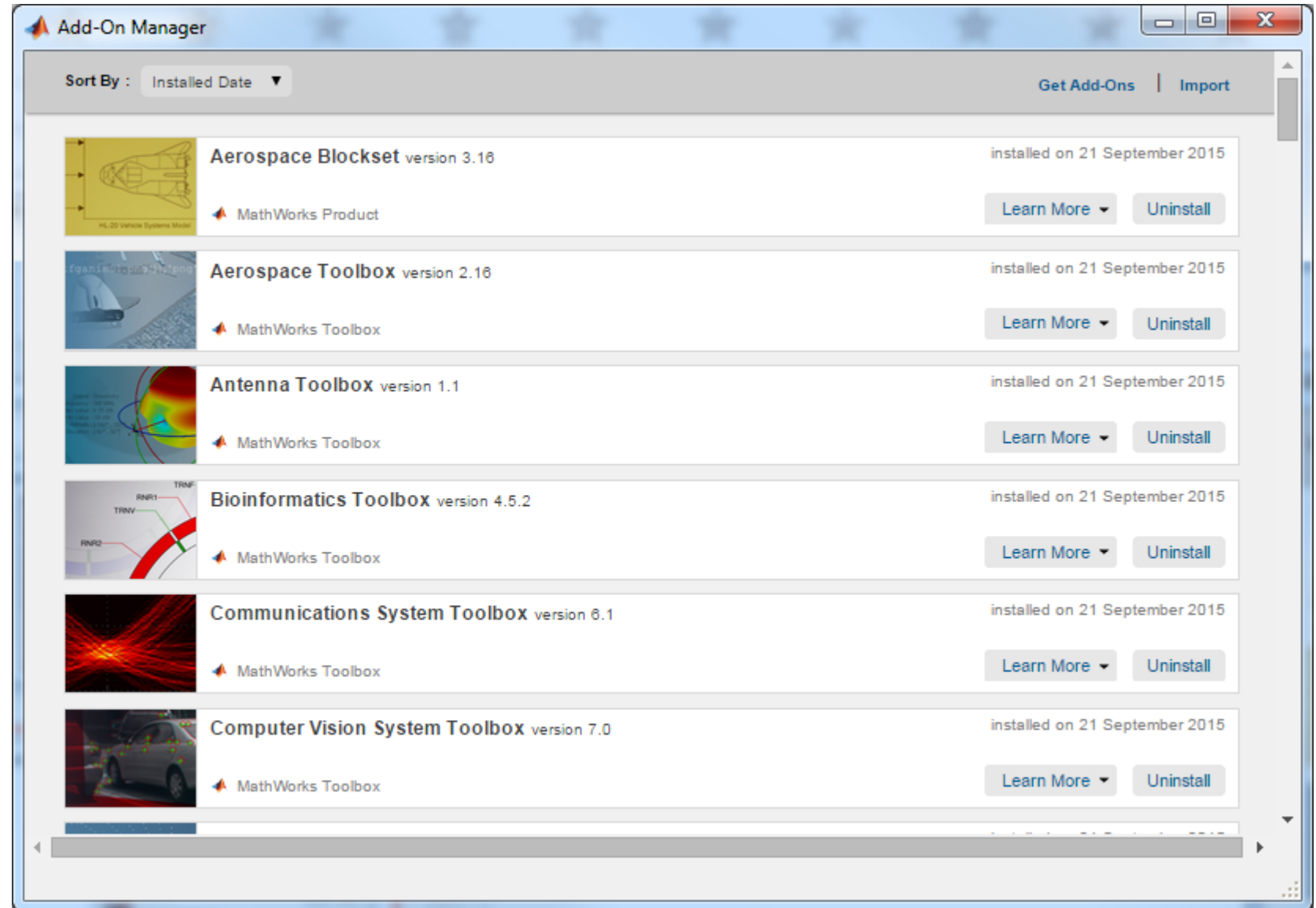
Add-On Manager



Add-On Manager



Add-On Manager



Add-On Explorer

I searched for “Vibration”

133 results

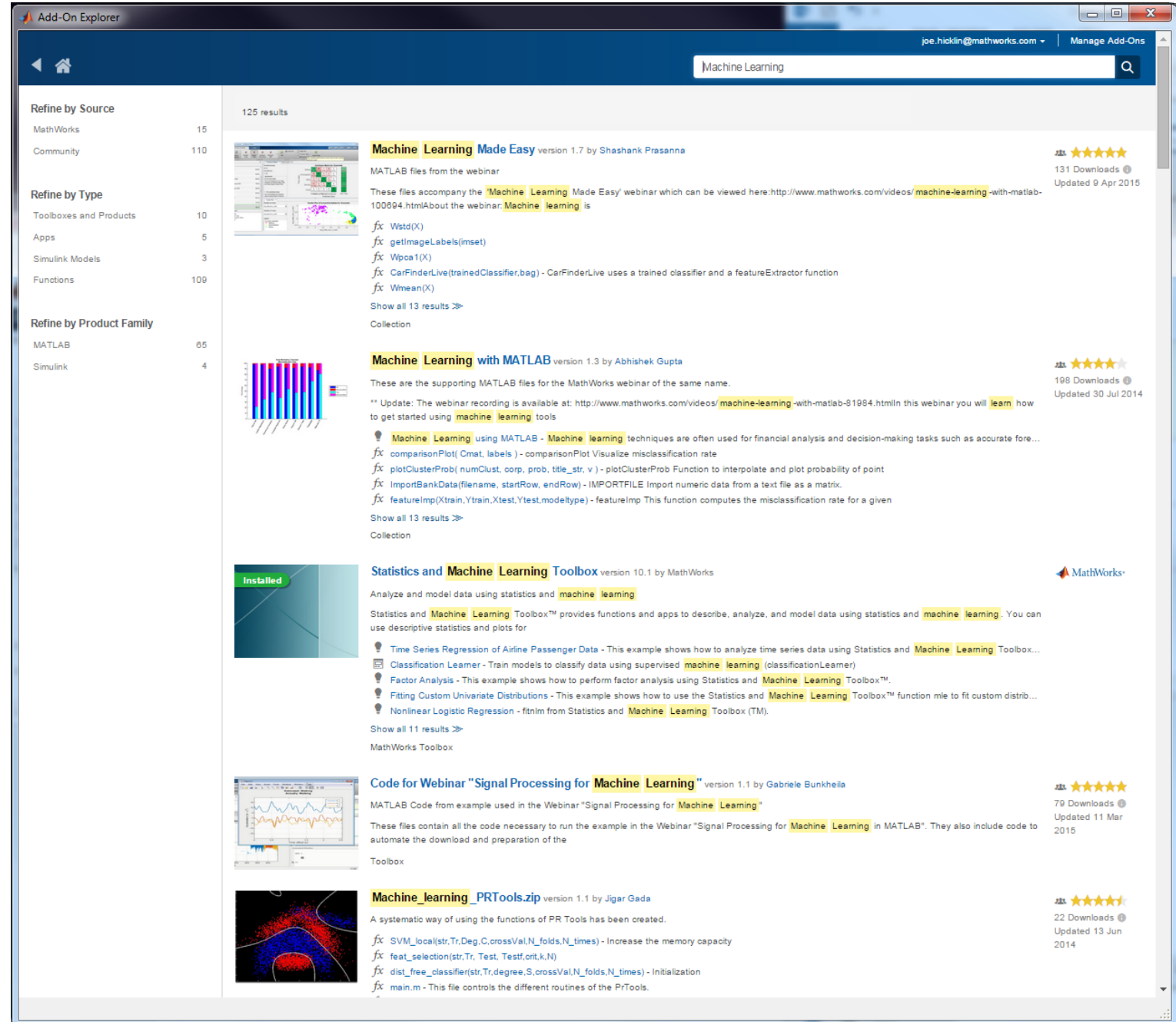
“Spectral”

512 results

“Machine Learning”

125 results

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The screenshot shows the Add-On Explorer interface with a search bar containing "Machine Learning". The left sidebar shows filters for "Refine by Source" (MathWorks: 15, Community: 110) and "Refine by Type" (Toolboxes and Products: 10, Apps: 5, Simulink Models: 3, Functions: 100). The main area displays 125 results. The top results include:

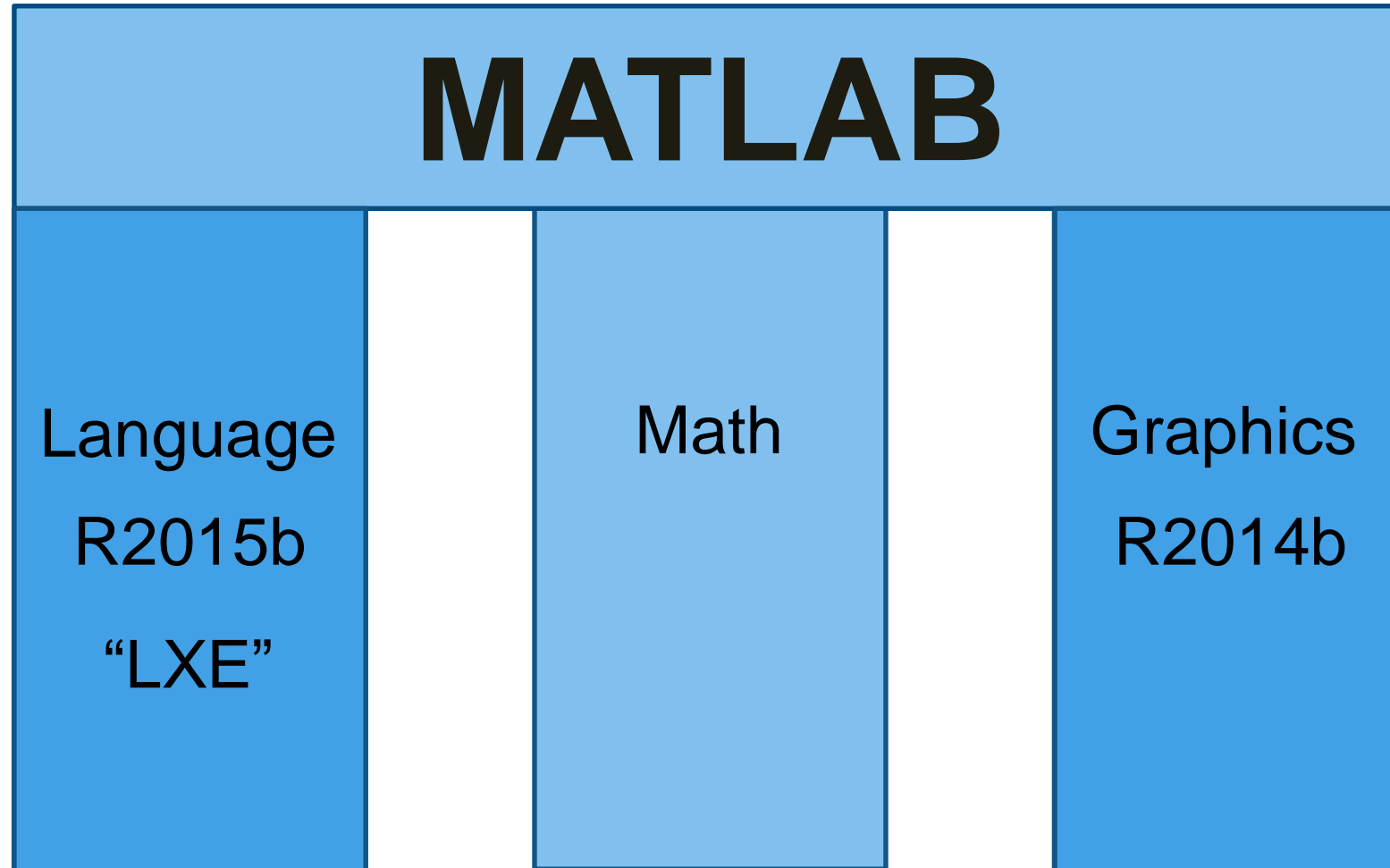
- Machine Learning Made Easy** version 1.7 by Shashank Prasanna. Description: MATLAB files from the webinar. These files accompany the 'Machine Learning Made Easy' webinar which can be viewed here: <http://www.mathworks.com/videos/machine-learning-with-matlab-100894.html>. About the webinar: Machine learning is. Functions: `Wstd(X)`, `getImageLabels(mset)`, `Wpca1(X)`, `CarFinderLive(trainedClassifier,bag)` - CarFinderLive uses a trained classifier and a featureExtractor function, `Wmean(X)`. 131 Downloads, Updated 9 Apr 2015.
- Machine Learning with MATLAB** version 1.3 by Abhishek Gupta. Description: These are the supporting MATLAB files for the MathWorks webinar of the same name. ** Update: The webinar recording is available at: <http://www.mathworks.com/videos/machine-learning-with-matlab-31984.html>. In this webinar you will learn how to get started using machine learning tools. Functions: `comparisonPlot(Cmat, labels)` - comparisonPlot Visualize misclassification rate, `plotClusterProb(numClust, corp, prob, title_str, v)` - plotClusterProb Function to interpolate and plot probability of point, `ImportBankData(filename, startRow, endRow)` - IMPORTFILE Import numeric data from a text file as a matrix, `featureImp(Xtrain, Ytrain, Xtest, Ytest, modeltype)` - featureImp This function computes the misclassification rate for a given. 198 Downloads, Updated 30 Jul 2014.
- Statistics and Machine Learning Toolbox** version 10.1 by MathWorks. Description: Analyze and model data using statistics and machine learning. Statistics and Machine Learning Toolbox™ provides functions and apps to describe, analyze, and model data using statistics and machine learning. You can use descriptive statistics and plots for: Time Series Regression of Airline Passenger Data - This example shows how to analyze time series data using Statistics and Machine Learning Toolbox... Classification Learner - Train models to classify data using supervised machine learning (classificationLearner) Factor Analysis - This example shows how to perform factor analysis using Statistics and Machine Learning Toolbox™. Fitting Custom Univariate Distributions - This example shows how to use the Statistics and Machine Learning Toolbox™ function `fitlm` to fit custom distrib... Nonlinear Logistic Regression - `fitnlm` from Statistics and Machine Learning Toolbox (TM). 79 Downloads, Updated 11 Mar 2015.
- Code for Webinar "Signal Processing for Machine Learning"** version 1.1 by Gabriele Bunkheila. Description: MATLAB Code from example used in the Webinar "Signal Processing for Machine Learning". They also include code to automate the download and preparation of the. 22 Downloads, Updated 13 Jun 2014.
- Machine_learning_PRTools.zip** version 1.1 by Jigar Gada. Description: A systematic way of using the functions of PR Tools has been created. Functions: `SVM_local(str, Tr, Deg, C, crossVal, N_folds, N_times)` - Increase the memory capacity, `feat_selection(str, Tr, Test, Testf, opt, k, N)`, `dist_free_classifier(str, Tr, degree, S, crossVal, N_folds, N_times)` - Initialization, `main.m` - This file controls the different routines of the PRTools.

Add-On Explorer

Vibration	133
Spectral	512
Machine Learning	125
Support Vector	226
Classify	411
Detect	1342
Control	3919
Control Phase	191
Love	26
Beauty	26
Truth	84
Beer	10
Monkey	3
Yogurt	0

Don't start doing this when you have a deadline!

MATLAB Execution Engine



MATLAB Execution Engine

Old system had two different execution mechanisms – a JIT and an Interpreter.
New system has a single execution mechanism.

Old JIT was designed for FORTRAN-like constructs within MATLAB.
New JIT is designed for the entire MATLAB language.

Old system had a monolithic architecture that was difficult to extend.
New system has a Modular, Thread-safe, and Platform re-targetable architecture.

MATLAB Execution Engine

Performance Improvement Highlights

Econometrics Toolbox: American Basket Demo executes **60% faster**

Image processing with active contours executes **32% faster**

SVM classification for Machine Learning executes **12% faster**

Examples used in “Speeding up MATLAB” webinar execute **30% faster**

k-NN classification for Machine Learning executes **37% faster**

Machine Learning classification executes **25% faster**

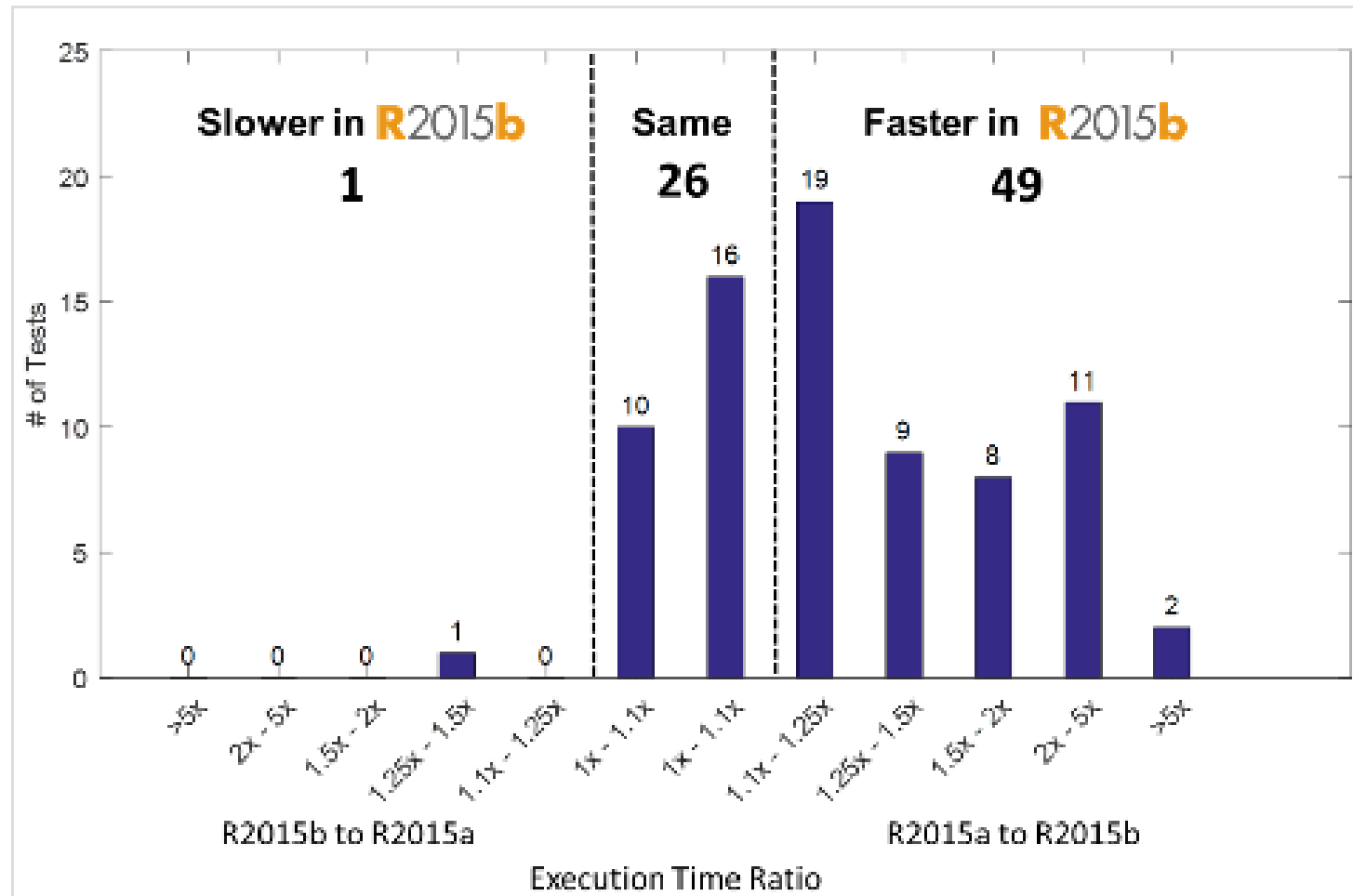
Image Processing executes **15% faster**

Performance in Object-Oriented MATLAB Code on File Exchange executes **10-40% faster**

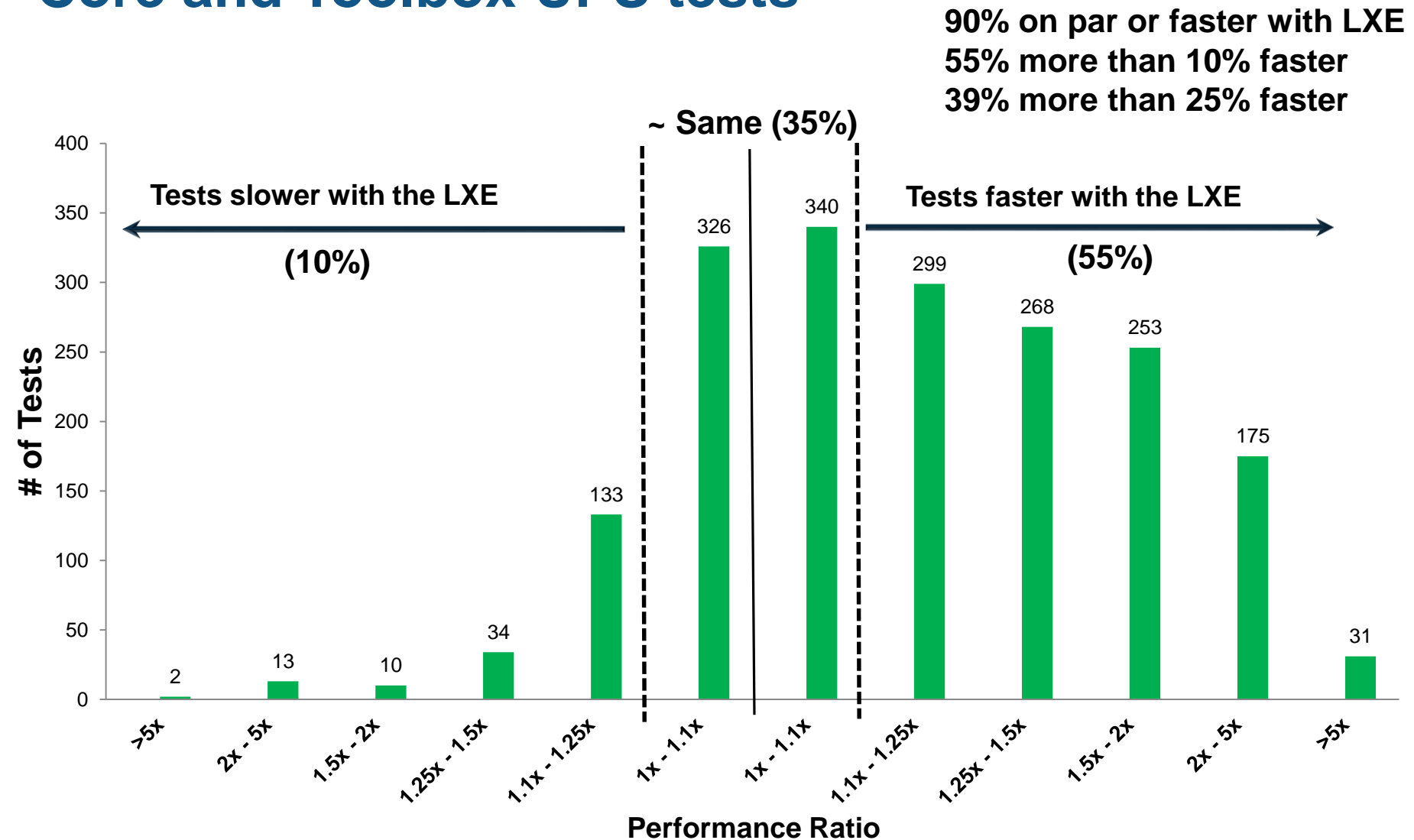
Wireless Application demo executes **50% faster**

Application Level Benchmarks

99% on par or faster with LXE
64% more than 10% faster



Core and Toolbox UPS tests



MATLAB Execution Engine

Summary

R2015b runs MATLAB programs faster than previous releases.

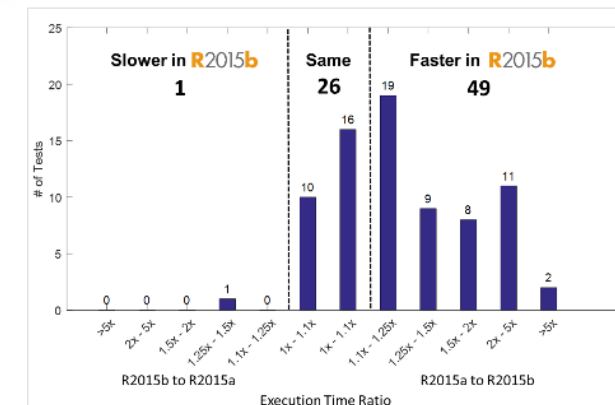
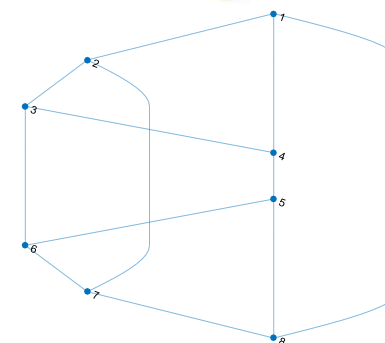
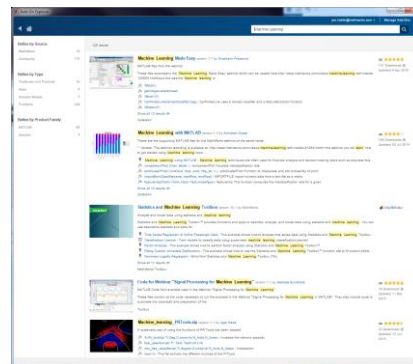
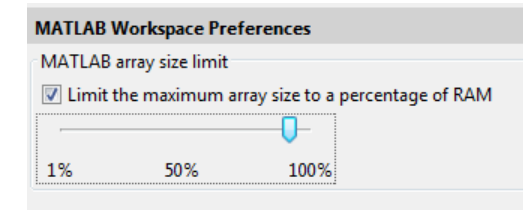
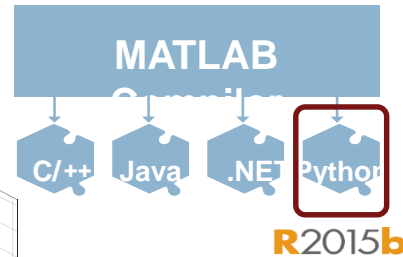
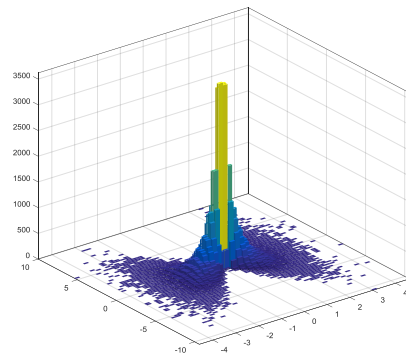
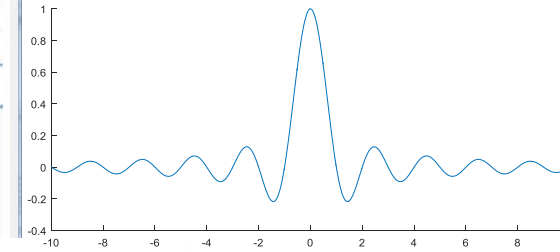
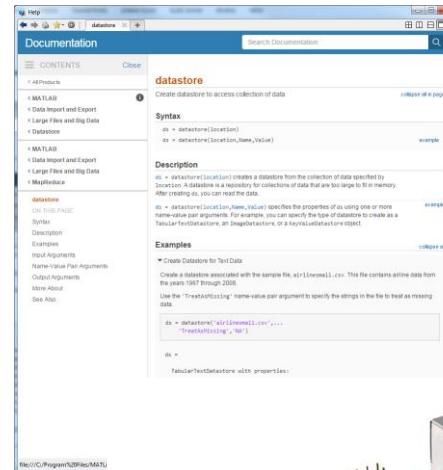
We will to continue to increase performance.

We will add new features more easily and more quickly.

What's New in MATLAB 2015

```
>> T(1:15, :)
ans =
```

DepTime	ArrTime	UniqueCarrier	FlightNum	ArrDelay	DepDelay	Origin	Dest
'1434'	'1522'	'AS'	67	7	14	'SEA'	'KTN'
'1545'	'1628'	'AS'	67	-7	-5	'KTN'	'SIT'
'1500'	'1600'	'AS'	67	25	20	'SEA'	'KTN'
'1114'	'1342'	'TW'	469	2	-1	'SJO'	'MIA'
'1725'	'2104'	'EA'	940	-2	0	'PHL'	'SEA'
'700'	'1101'	'AA'	662	24	0	'SJO'	'JFK'
'1735'	'2131'	'AS'	688	13	0	'SJO'	'JFK'
'1829'	'2000'	'EA'	942	0	0	'SJO'	'MIA'
'1301'	'1925'	'AA'	606	-6	1	'DFW'	'SJO'
'1326'	'1947'	'AA'	919	1	7	'ORD'	'SJO'
'945'	'1249'	'AS'	60	84	65	'KTN'	'SEA'
'700'	'752'	'AS'	60	2	0	'JNU'	'KTN'
'825'	'1100'	'AS'	60	-10	0	'KTN'	'SEA'
'740'	'1034'	'AS'	60	14	0	'KTN'	'SEA'
'1002'	'1025'	'OS'	295	-9	-3	'DCA'	'IND'



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