

Lab 5

CPS 563 – Data Visualization

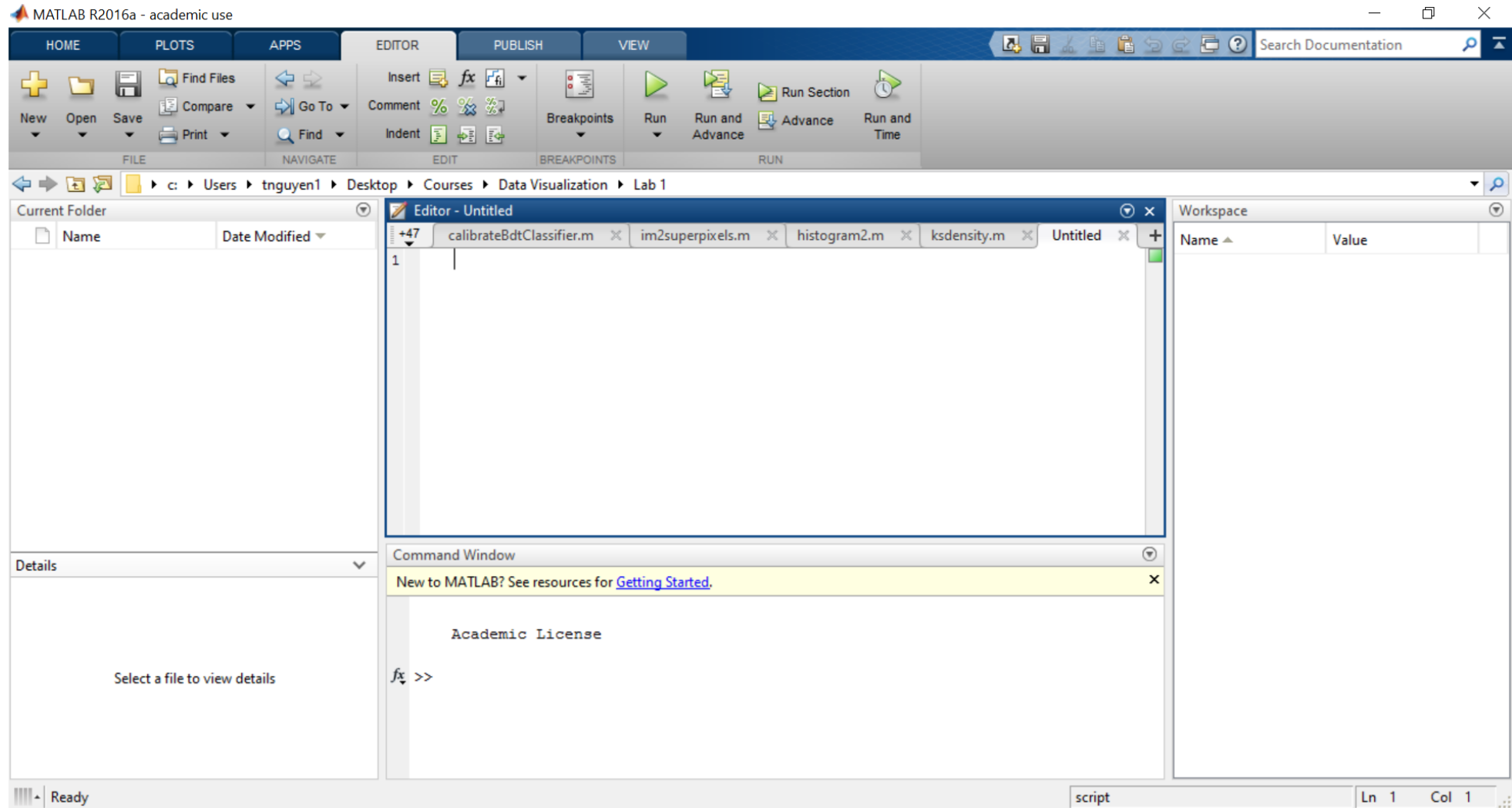
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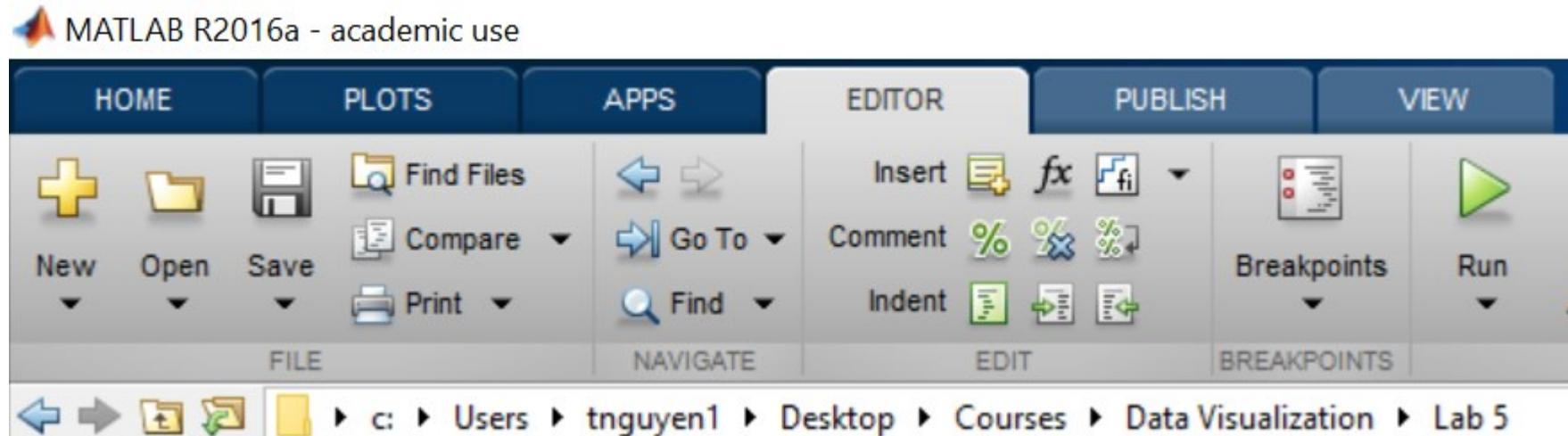
Outline

- Practice with parallel coordinates

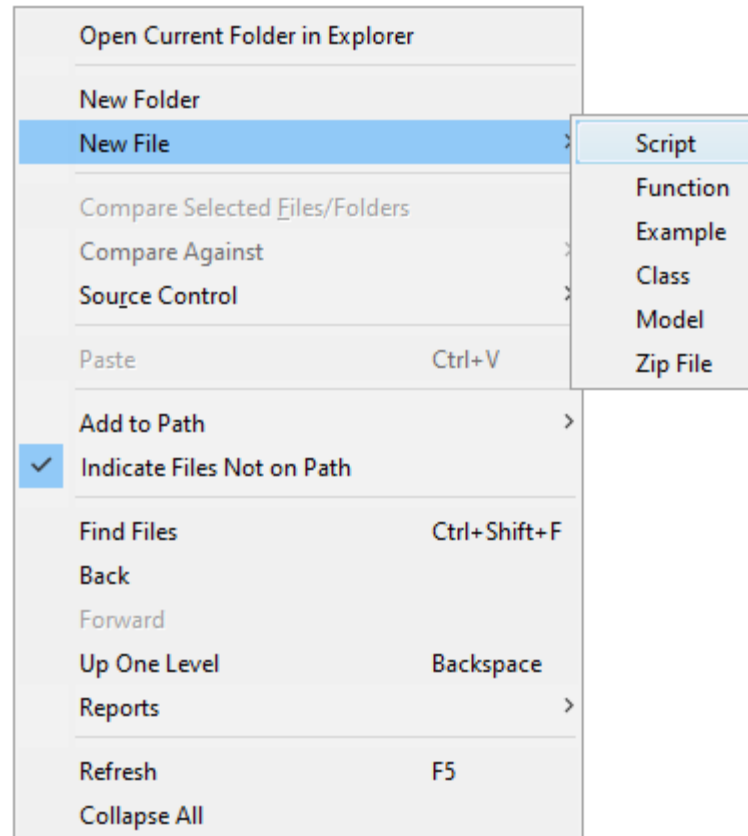
Start MATLAB



Create Lab 5 folder



Create new script file: Lab5.m



Lab5.m

```
close all;  
clear all;  
clc;
```

Generate random data

```
npoints=10;  
ndims = 4;  
data = zeros(ndims, npoints);  
  
for i = 1:npoints  
    for j = 1:ndims  
        data(j,i) = randn;  
    end  
end
```

Plot data points

hold on

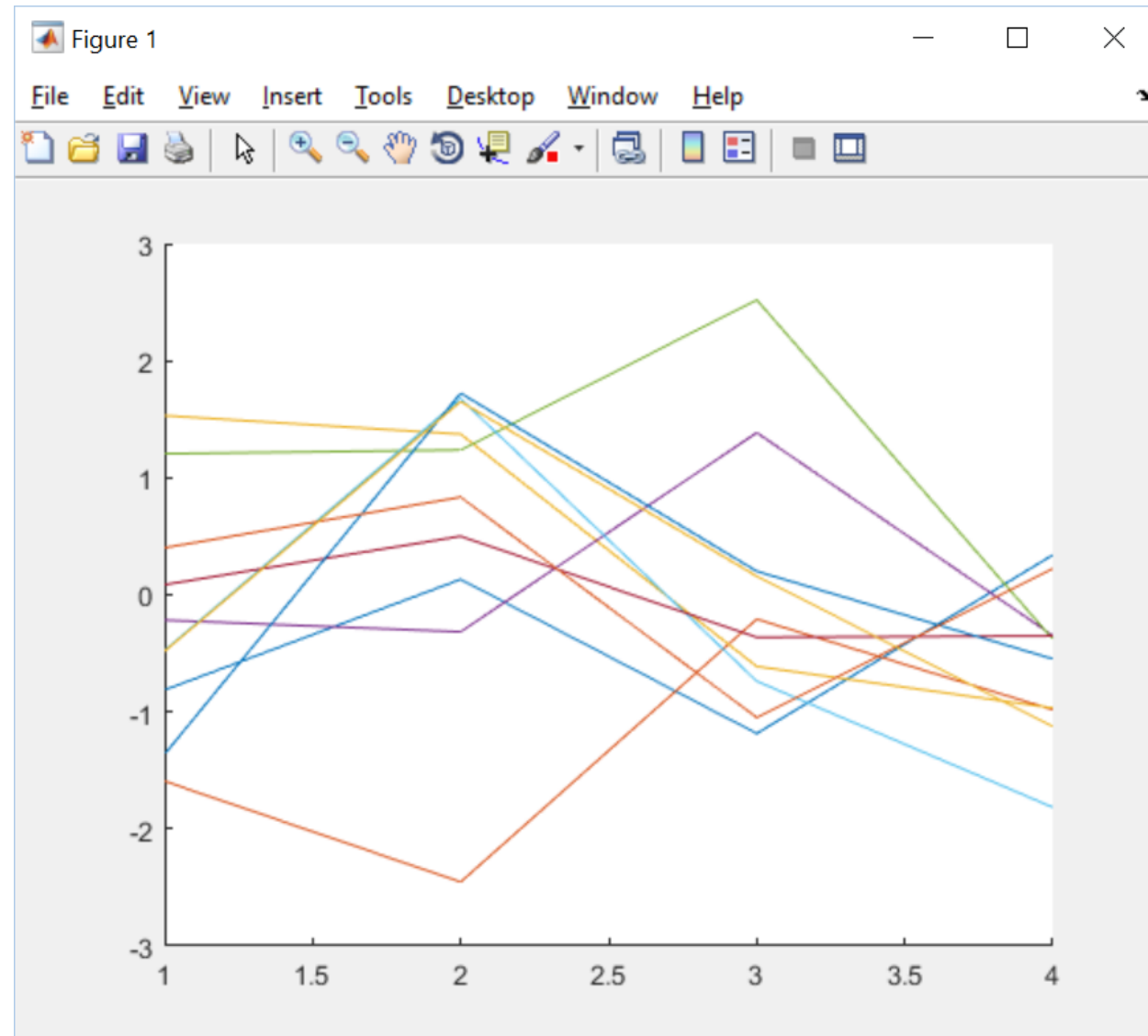
for i = 1:npoints

 plot(data(:,i));

end

hold off

Run Lab5.m



Update the labels

hold on

for i = 1:npoints

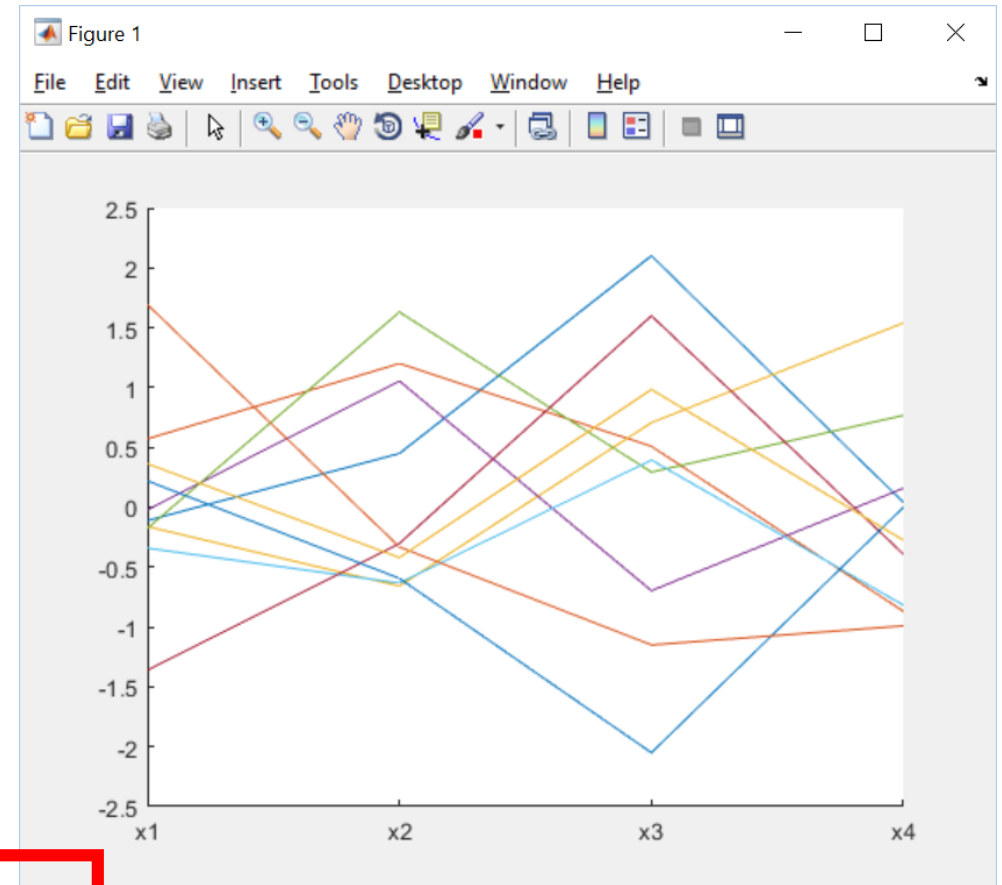
 plot(data(:,i));

end

hold off

```
% set(gca, 'xtick',[1 2 3 4]);
```

```
set(gca, 'xticklabel', {'x1', 'x2', 'x3', 'x4'});
```



Increase the number of data points

```
clear all;
```

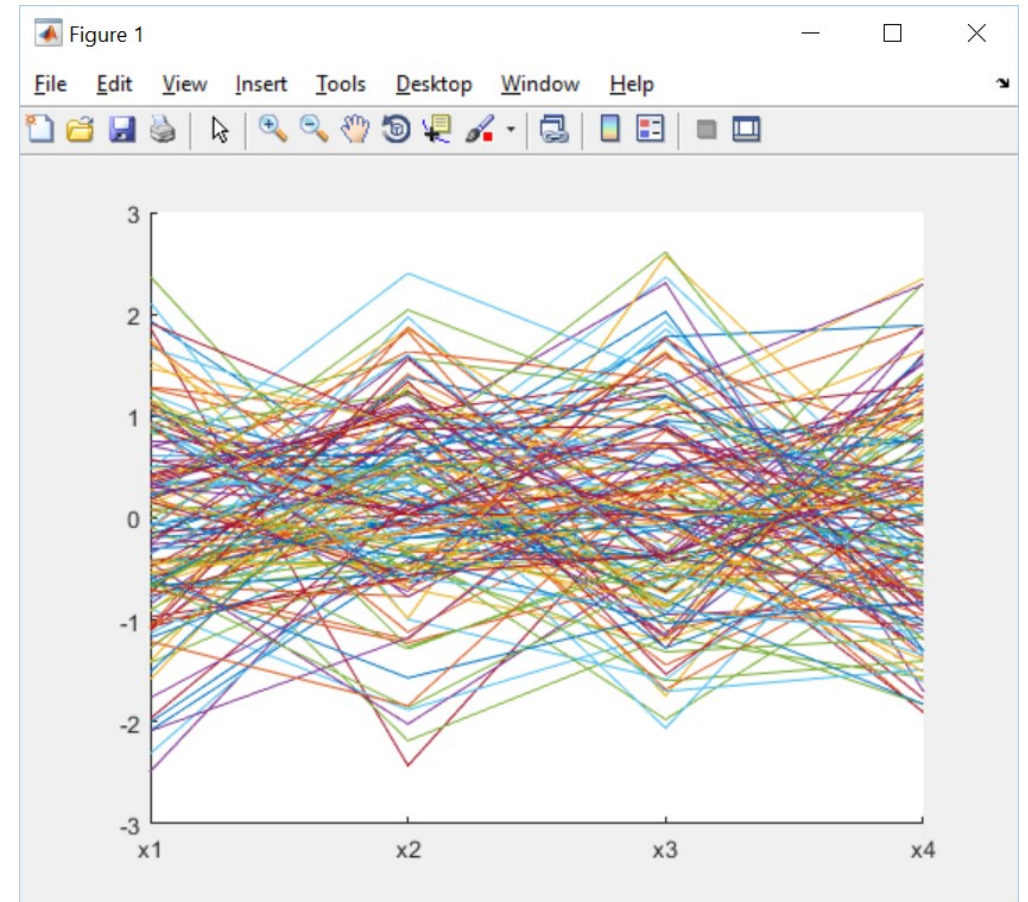
```
close all;
```

```
clc;
```

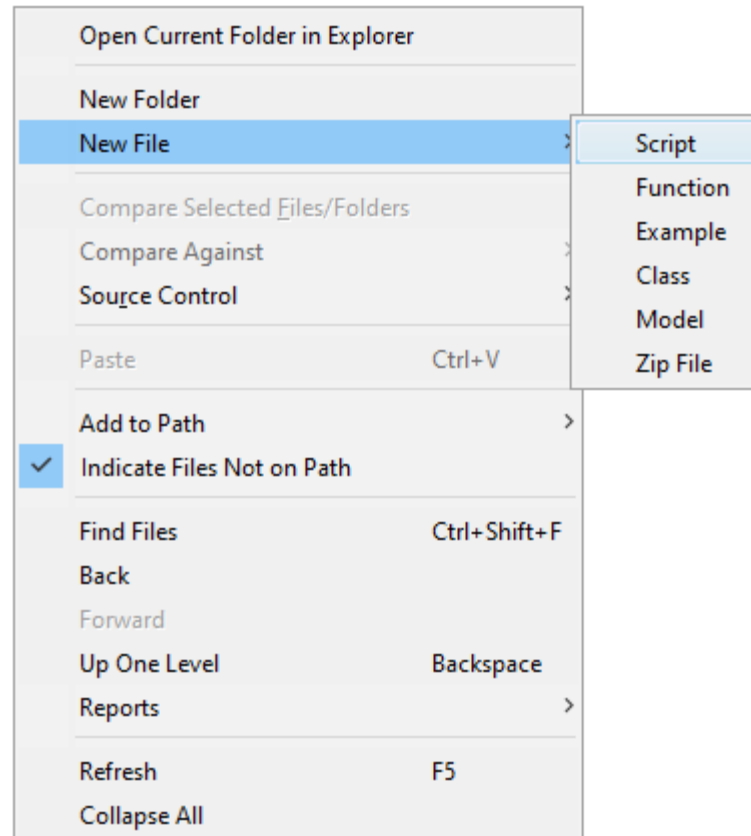
```
npoints=150;
```

```
ndims = 4;
```

```
data = zeros(ndims, npoints);
```



Create new script: Lab5b.m



Lab5b.m

```
close all;  
clear all;  
clc;
```

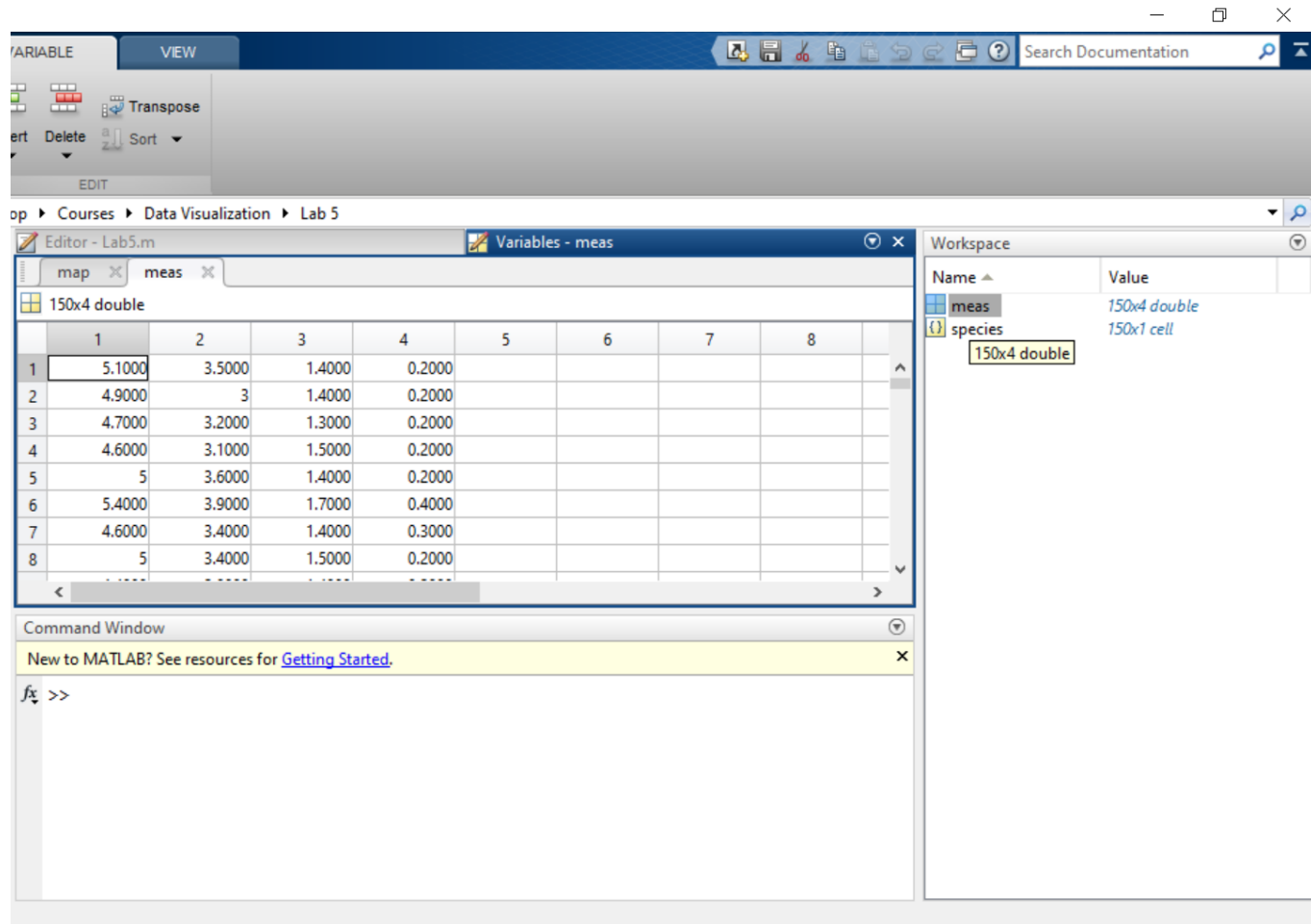
Load Iris dataset

close all;

clear all;

clc;

load fisheriris;



Examine the data

The image shows the MATLAB environment with the following components:

- Top Toolbar:** Includes icons for saving, deleting, and other file operations, along with a "Search Documentation" field.
- Variable Editor:** Displays the "species" variable as a 150x1 cell array. The first eight rows are visible, all containing the value "setosa".
- Workspace:** A table listing variables in the current workspace. The "species" variable is highlighted with a red box, showing its name and value (150x1 cell).
- Command Window:** Shows the MATLAB prompt "fx >>" and a message: "New to MATLAB? See resources for [Getting Started](#)."

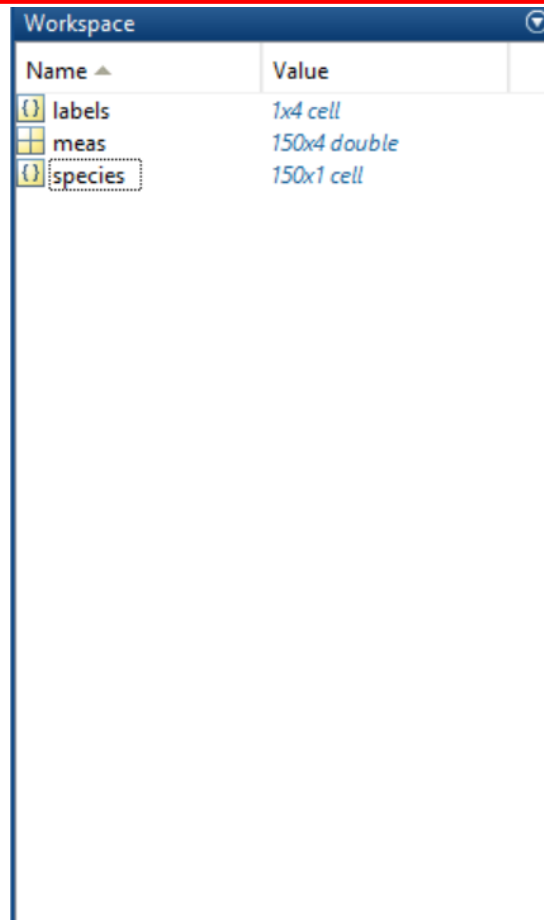
| Name | Value |
|---------|--------------|
| meas | 150x4 double |
| species | 150x1 cell |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|--------|---|---|---|---|---|---|---|
| 1 | setosa | | | | | | | |
| 2 | setosa | | | | | | | |
| 3 | setosa | | | | | | | |
| 4 | setosa | | | | | | | |
| 5 | setosa | | | | | | | |
| 6 | setosa | | | | | | | |
| 7 | setosa | | | | | | | |
| 8 | setosa | | | | | | | |

Set the labels

```
load fisheriris;
```

```
labels = {'Sepal Length','Sepal Width','Petal Length','Petal Width'};
```



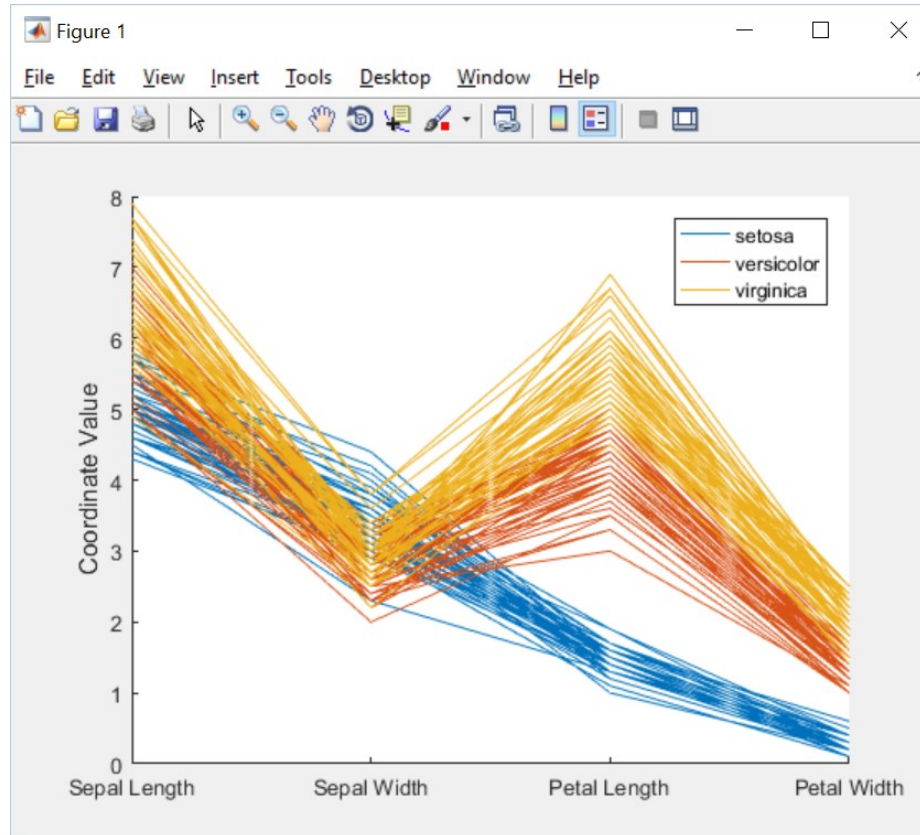
The image shows a screenshot of the MATLAB Workspace window. It contains a table with two columns: 'Name' and 'Value'. The 'Name' column lists three variables: 'labels', 'meas', and 'species'. The 'Value' column shows their respective data types: '1x4 cell' for 'labels', '150x4 double' for 'meas', and '150x1 cell' for 'species'. The 'labels' variable is highlighted with a dashed border.

| Name ▲ | Value |
|---------|--------------|
| labels | 1x4 cell |
| meas | 150x4 double |
| species | 150x1 cell |

Parallel Coordinates

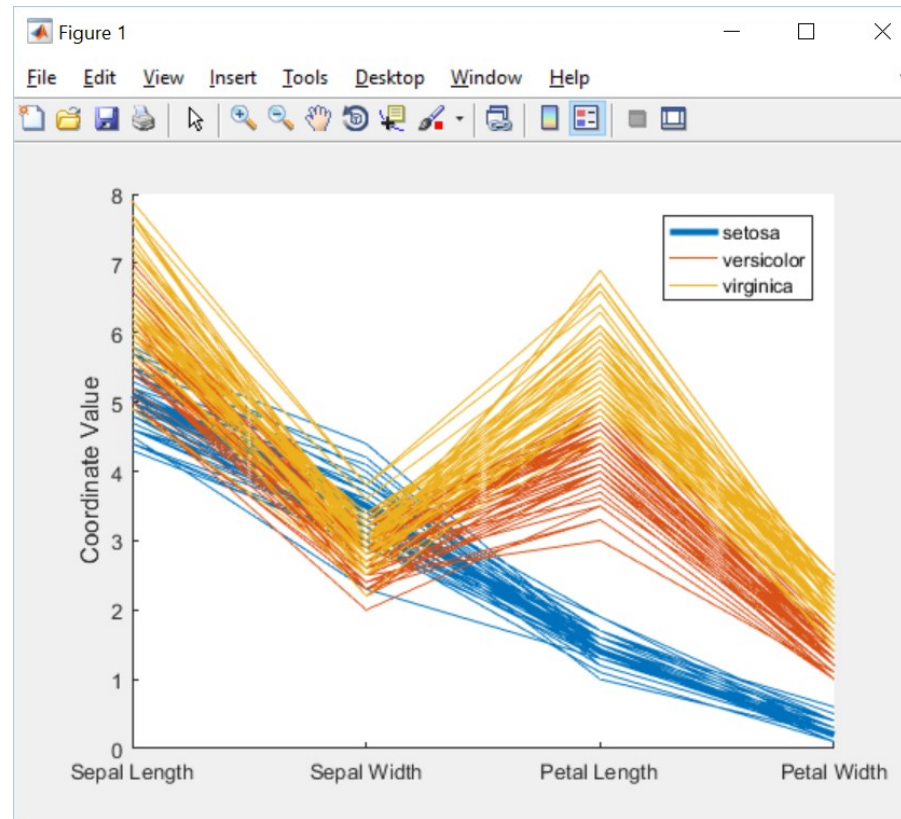
```
labels = {'Sepal Length','Sepal Width','Petal Length','Petal Width'};
```

```
parallelcoords(meas,'Group',species,'Labels',labels);
```



Update the line width

```
h = parallelcoords(meas,'Group',species,'Labels',labels);  
h(1).LineWidth = 3;
```

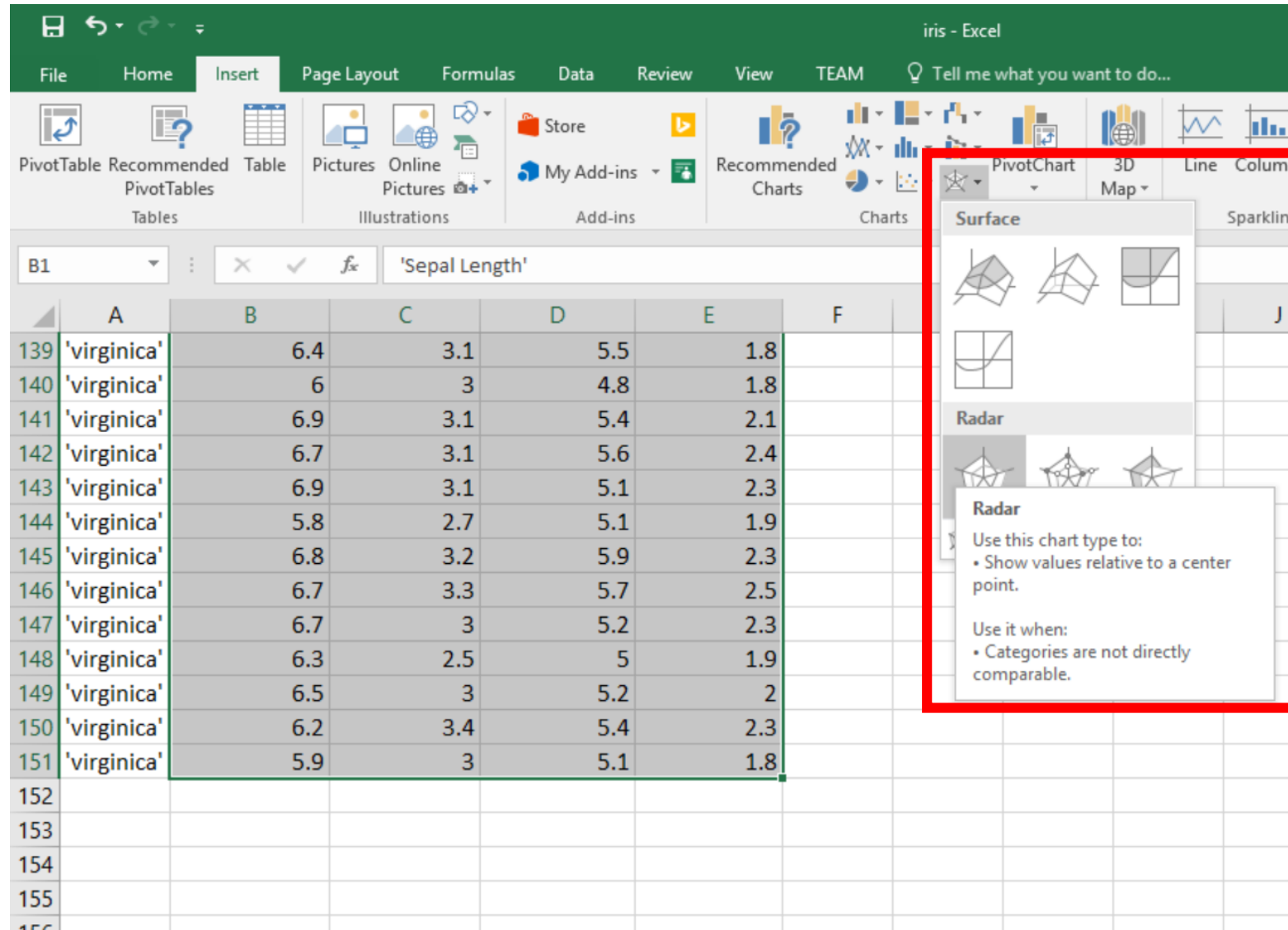


Copy data from MATLAB to Excel

The screenshot shows the Microsoft Excel interface with the 'iris' file open. The data is organized as follows:

| | species | B | C | D | E | F | G |
|----|----------|---------------|---------------|----------------|---------------|---|---|
| 1 | | Sepal Length' | 'Sepal Width' | 'Petal Length' | 'Petal Width' | | |
| 2 | 'setosa' | 0 | 3.5 | 1.4 | 0.2 | | |
| 3 | 'setosa' | 4.9 | 3 | 1.4 | 0.2 | | |
| 4 | 'setosa' | 4.7 | 3.2 | 1.3 | 0.2 | | |
| 5 | 'setosa' | 4.6 | 3.1 | 1.5 | 0.2 | | |
| 6 | 'setosa' | 5 | 3.6 | 1.4 | 0.2 | | |
| 7 | 'setosa' | 5.4 | 3.9 | 1.7 | 0.4 | | |
| 8 | 'setosa' | 4.6 | 3.4 | 1.4 | 0.3 | | |
| 9 | 'setosa' | 5 | 3.4 | 1.5 | 0.2 | | |
| 10 | 'setosa' | 4.4 | 2.9 | 1.4 | 0.2 | | |
| 11 | 'setosa' | 4.9 | 3.1 | 1.5 | 0.1 | | |
| 12 | 'setosa' | 5.4 | 3.7 | 1.5 | 0.2 | | |
| 13 | 'setosa' | 4.8 | 3.4 | 1.6 | 0.2 | | |
| 14 | 'setosa' | 4.8 | 3 | 1.4 | 0.1 | | |
| 15 | 'setosa' | 4.3 | 3 | 1.1 | 0.1 | | |
| 16 | 'setosa' | 5.8 | 4 | 1.2 | 0.2 | | |
| 17 | 'setosa' | 5.7 | 4.4 | 1.5 | 0.4 | | |
| 18 | 'setosa' | 5.1 | 3.9 | 1.3 | 0.1 | | |

Select data and choose graph



The screenshot shows the Microsoft Excel interface with the 'Insert' tab selected. The 'Charts' group is active, and the 'Radar' chart type is chosen. A red box highlights the chart selection area, and a tooltip for the Radar chart is visible.

Radar

Use this chart type to:

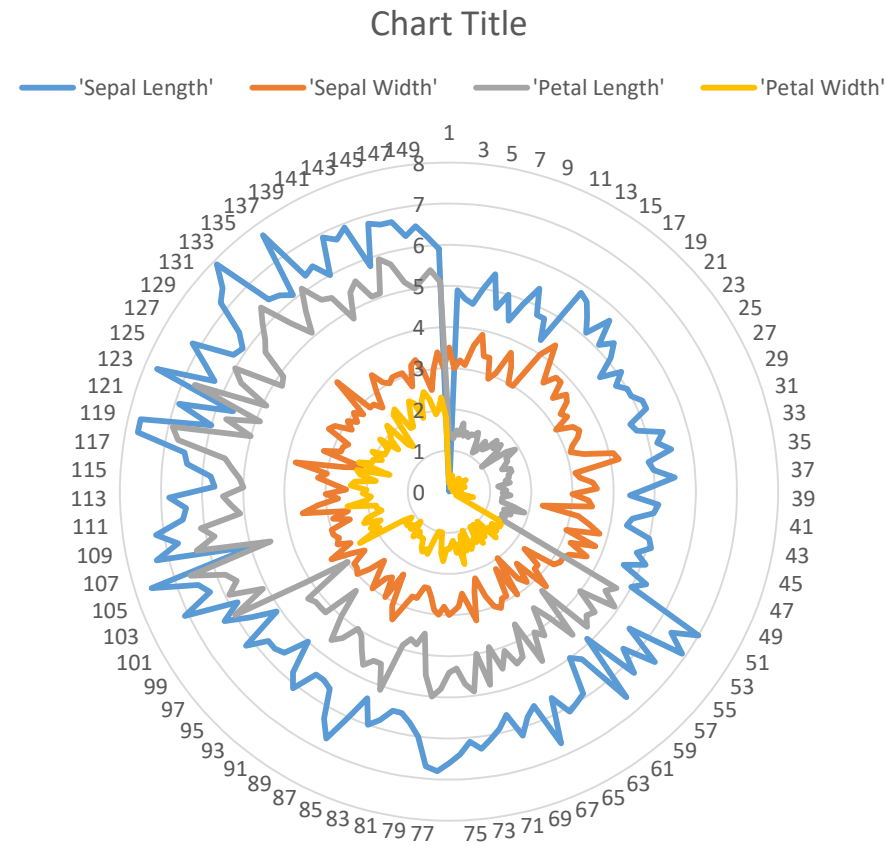
- Show values relative to a center point.

Use it when:

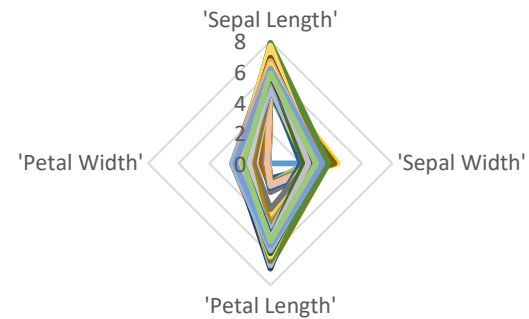
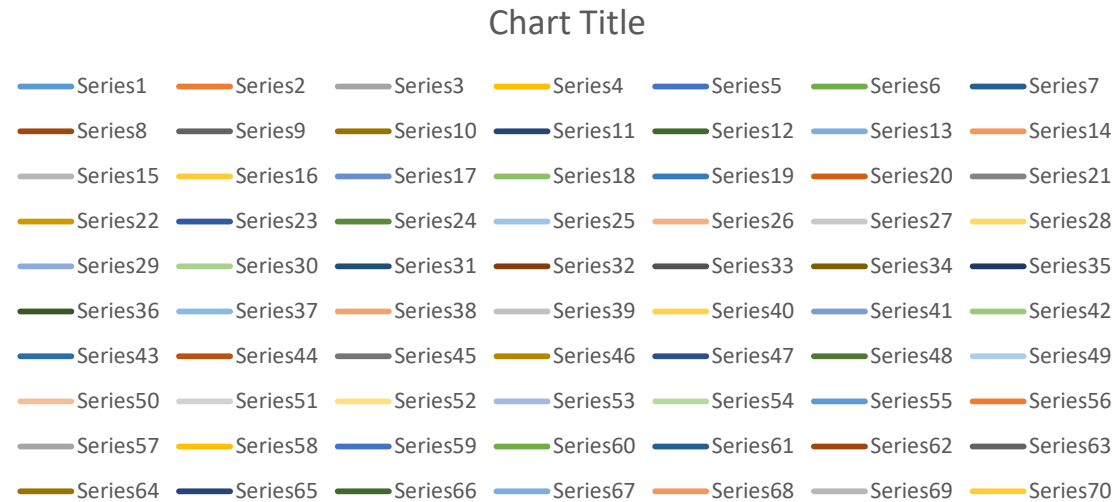
- Categories are not directly comparable.

| | A | B | C | D | E | F |
|-----|-------------|-----|-----|-----|-----|---|
| 139 | 'virginica' | 6.4 | 3.1 | 5.5 | 1.8 | |
| 140 | 'virginica' | 6 | 3 | 4.8 | 1.8 | |
| 141 | 'virginica' | 6.9 | 3.1 | 5.4 | 2.1 | |
| 142 | 'virginica' | 6.7 | 3.1 | 5.6 | 2.4 | |
| 143 | 'virginica' | 6.9 | 3.1 | 5.1 | 2.3 | |
| 144 | 'virginica' | 5.8 | 2.7 | 5.1 | 1.9 | |
| 145 | 'virginica' | 6.8 | 3.2 | 5.9 | 2.3 | |
| 146 | 'virginica' | 6.7 | 3.3 | 5.7 | 2.5 | |
| 147 | 'virginica' | 6.7 | 3 | 5.2 | 2.3 | |
| 148 | 'virginica' | 6.3 | 2.5 | 5 | 1.9 | |
| 149 | 'virginica' | 6.5 | 3 | 5.2 | 2 | |
| 150 | 'virginica' | 6.2 | 3.4 | 5.4 | 2.3 | |
| 151 | 'virginica' | 5.9 | 3 | 5.1 | 1.8 | |

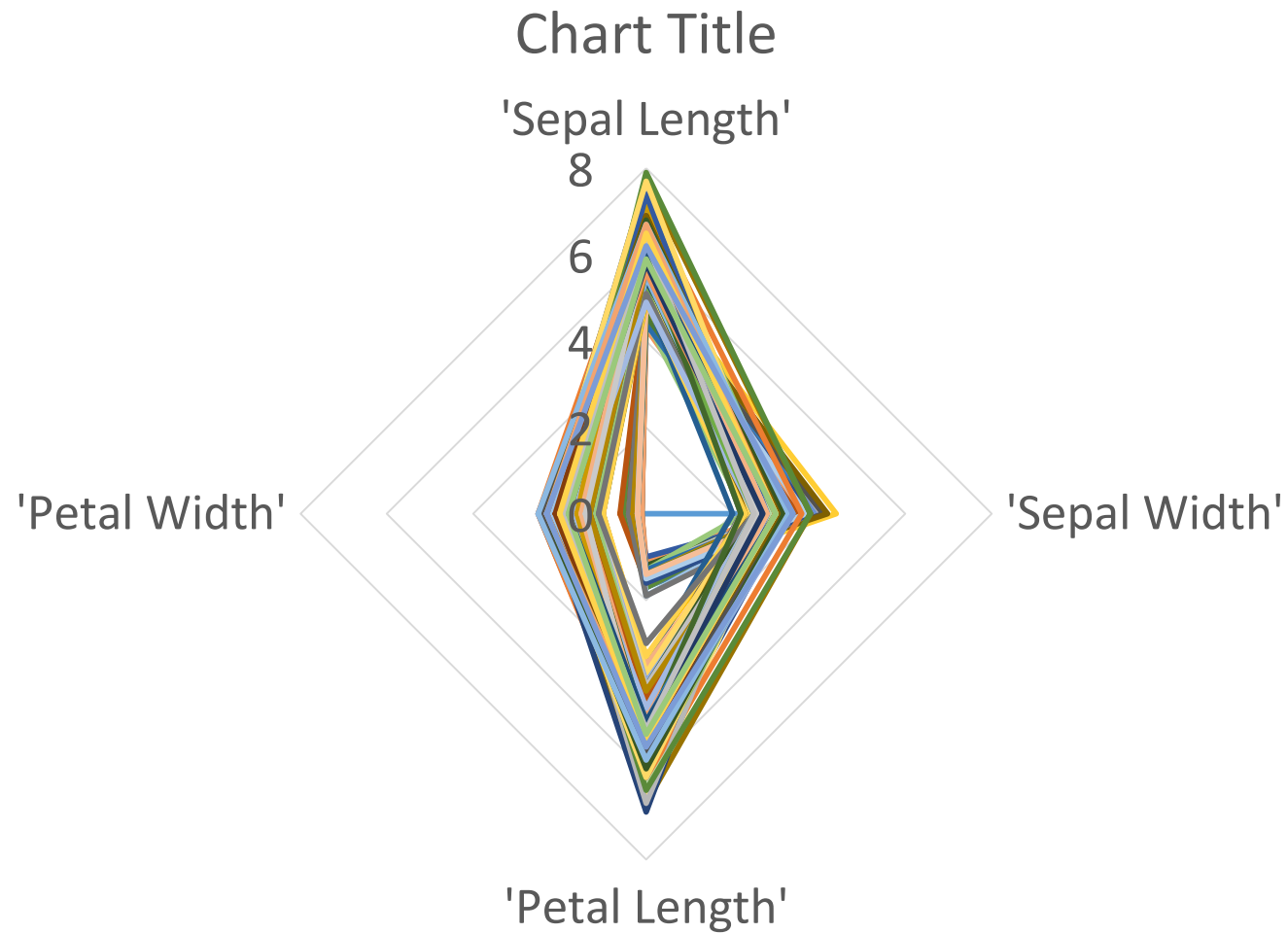
Radar Chart



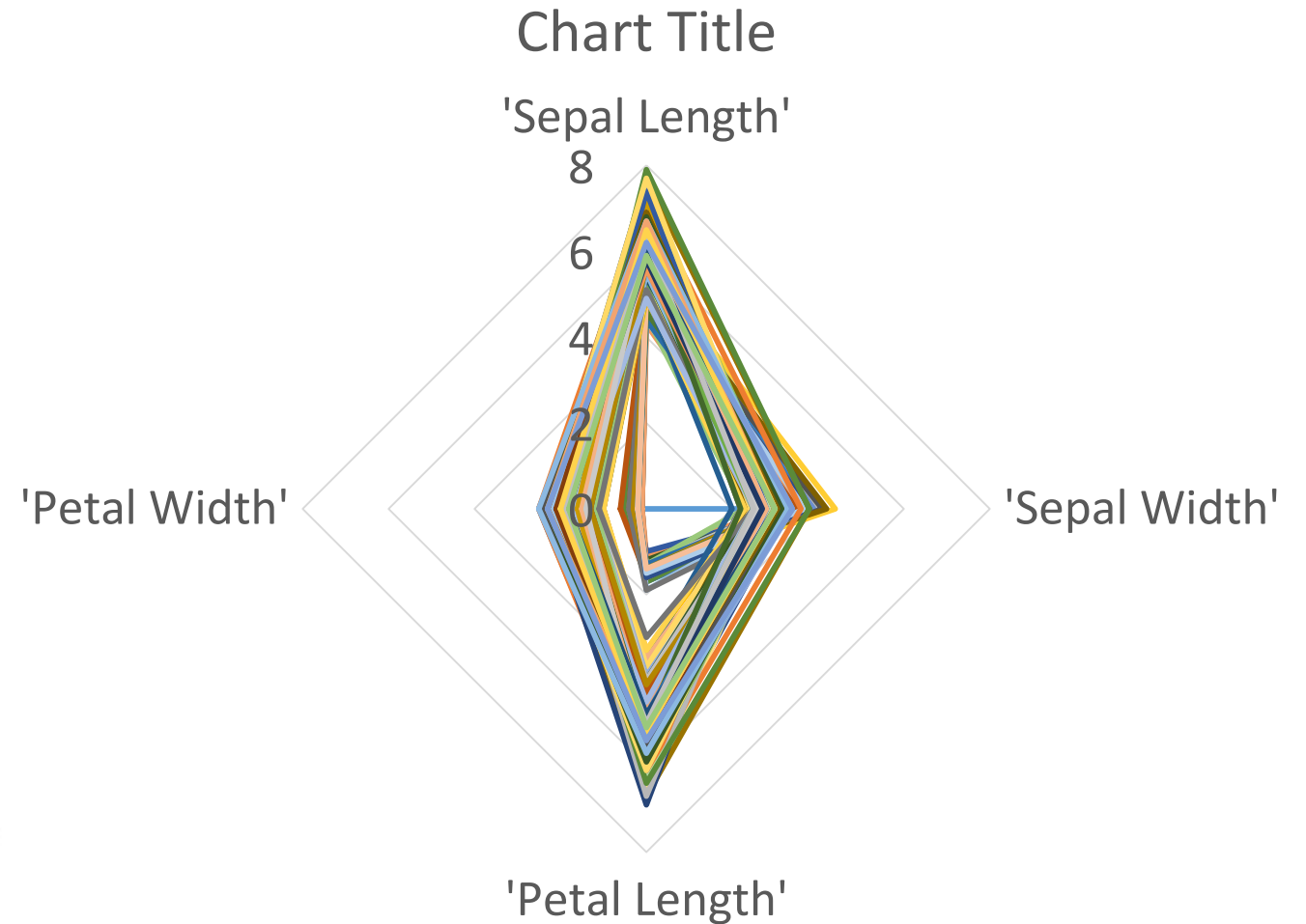
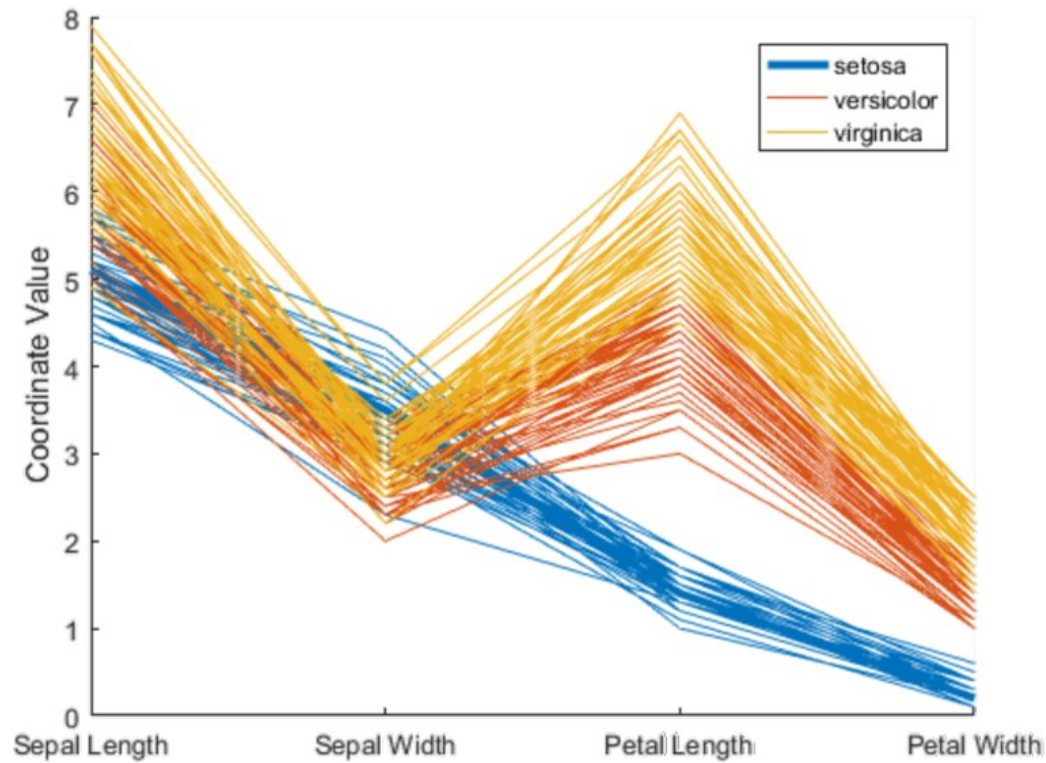
Switch Row/Column



Delete legend



Parallel Coordinates vs. Radar Chart



Q&A