

Plotting

PNI Summer Internship 2020
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Plotting

- Among the most important parts of analysis: get to “know” your data, identify problems, visualize results/analyses, share findings
- Common types of plots: line plot, scatter plot, bar plot, histograms, box plot

Plotting: line spec shortcuts

- Usage: `plot(x, y, 'linespec')`
- Combine any value of line style, marker, and color in a string
- Example: `plot(1:10, 1:10, 'ro-')`

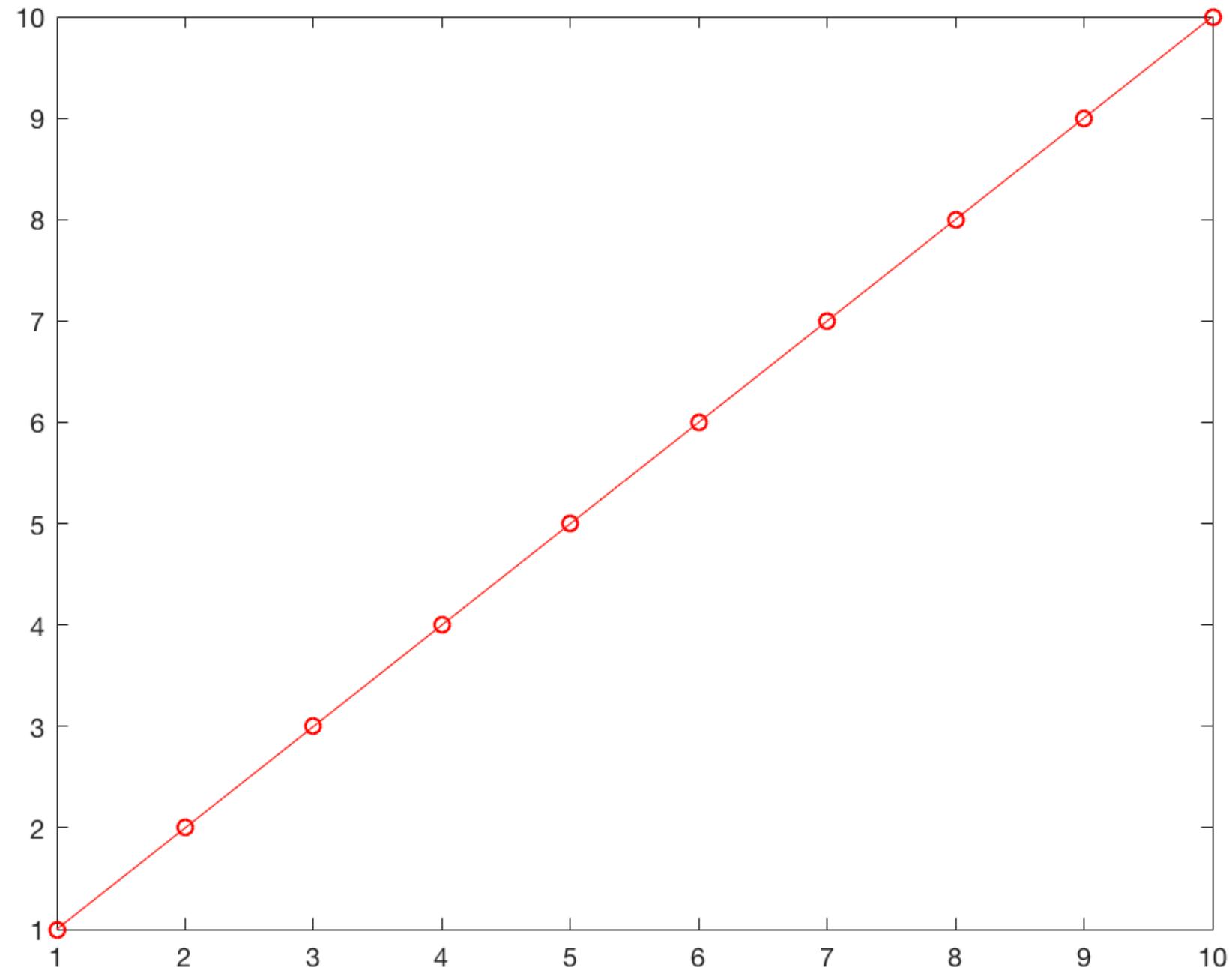
Line Style	Description
-	Solid line (default)
--	Dashed line
:	Dotted line
-.	Dash-dot line

Marker	Description
o	Circle
+	Plus sign
*	Asterisk
.	Point
x	Cross
s	Square
d	Diamond
^	Upward-pointing triangle
v	Downward-pointing triangle
>	Right-pointing triangle
<	Left-pointing triangle
p	Pentagram
h	Hexagram

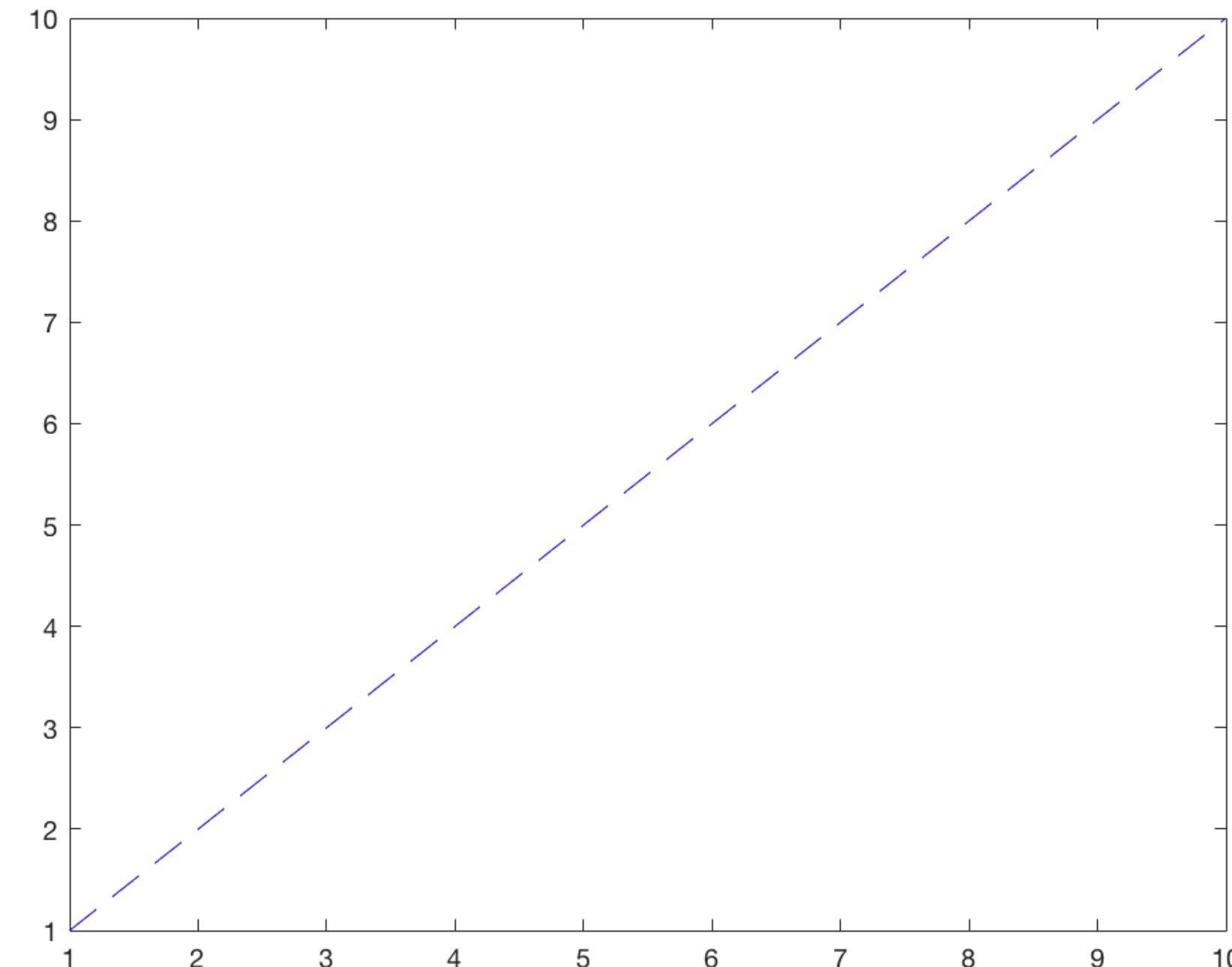
Color	Description
y	yellow
m	magenta
c	cyan
r	red
g	green
b	blue
w	white
k	black

Plotting: line spec shortcuts

- `plot(1:10, 1:10, 'ro-')`



- `plot(1:10, 1:10, 'ro-')`

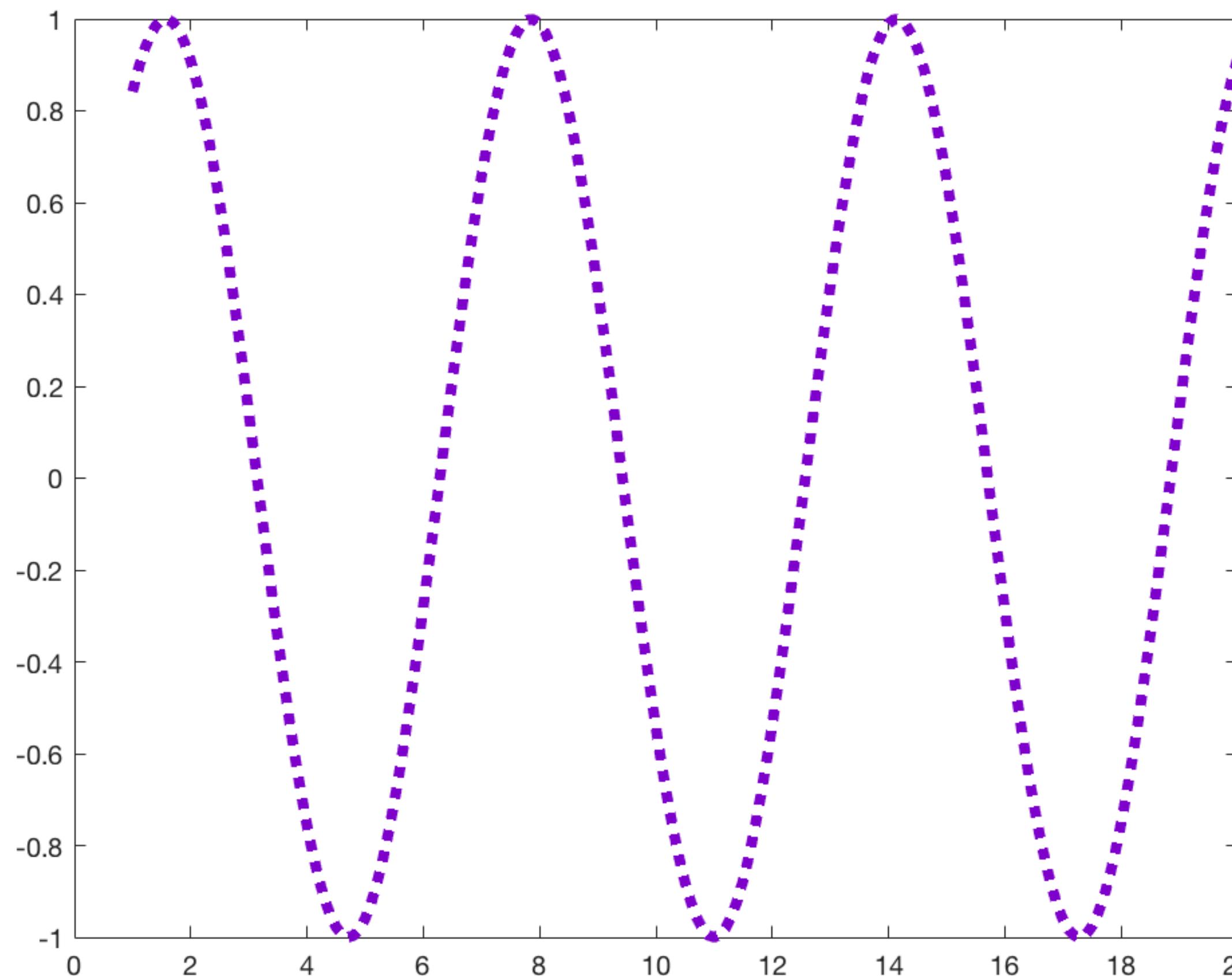


Plotting: name-value pair arguments

- Usage: `plot(x, y, 'propertyNameA', PropertyValueA,
'propertyNameB', properValueB);`
- Allows for control over appearance of plot lines/markers

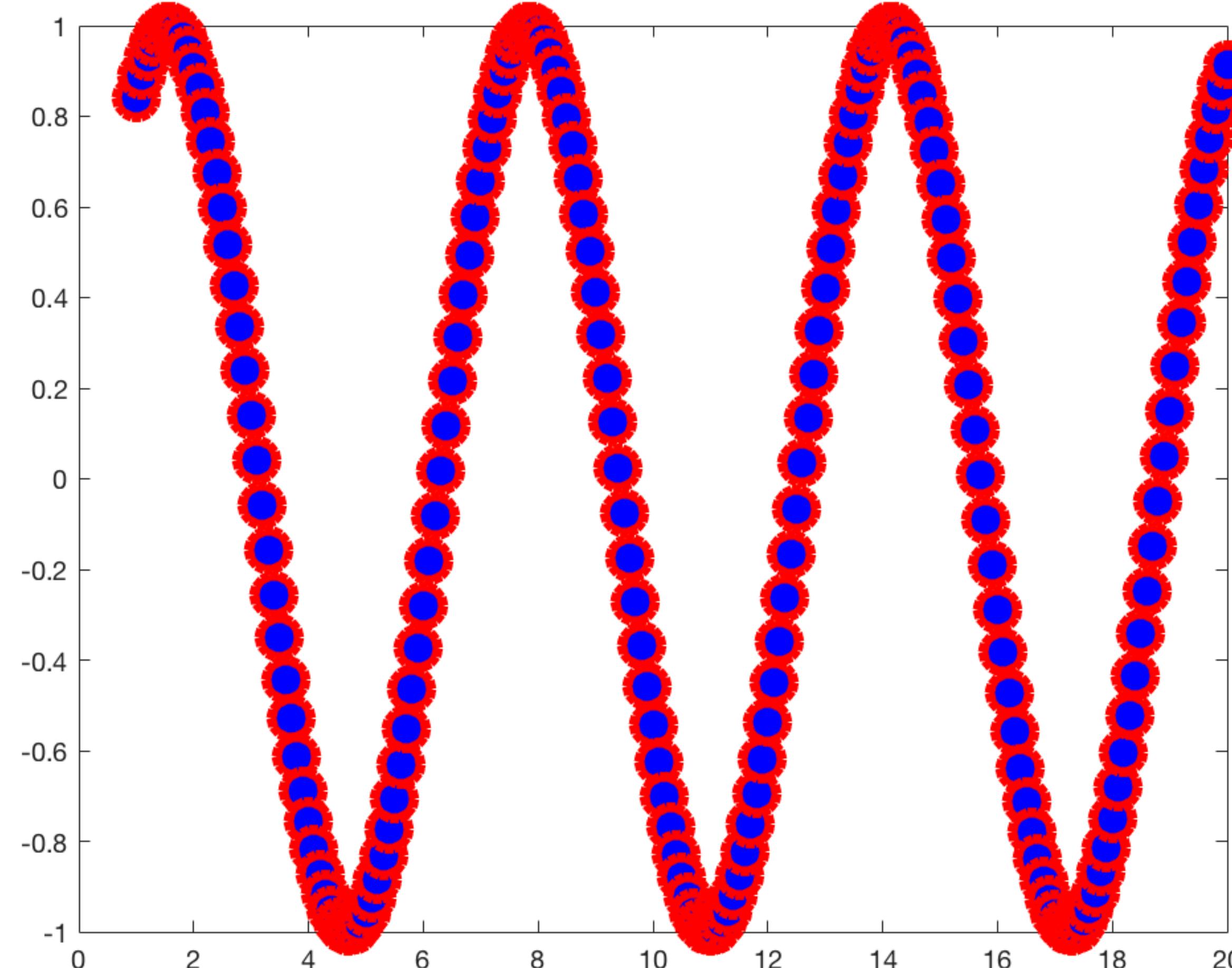
Plotting: name-value pair arguments

- `plot(1:.1:20, sin(1:.1:20), 'linewidth', 4, 'color', [.5 .1 .8], 'linestyle', ':')`

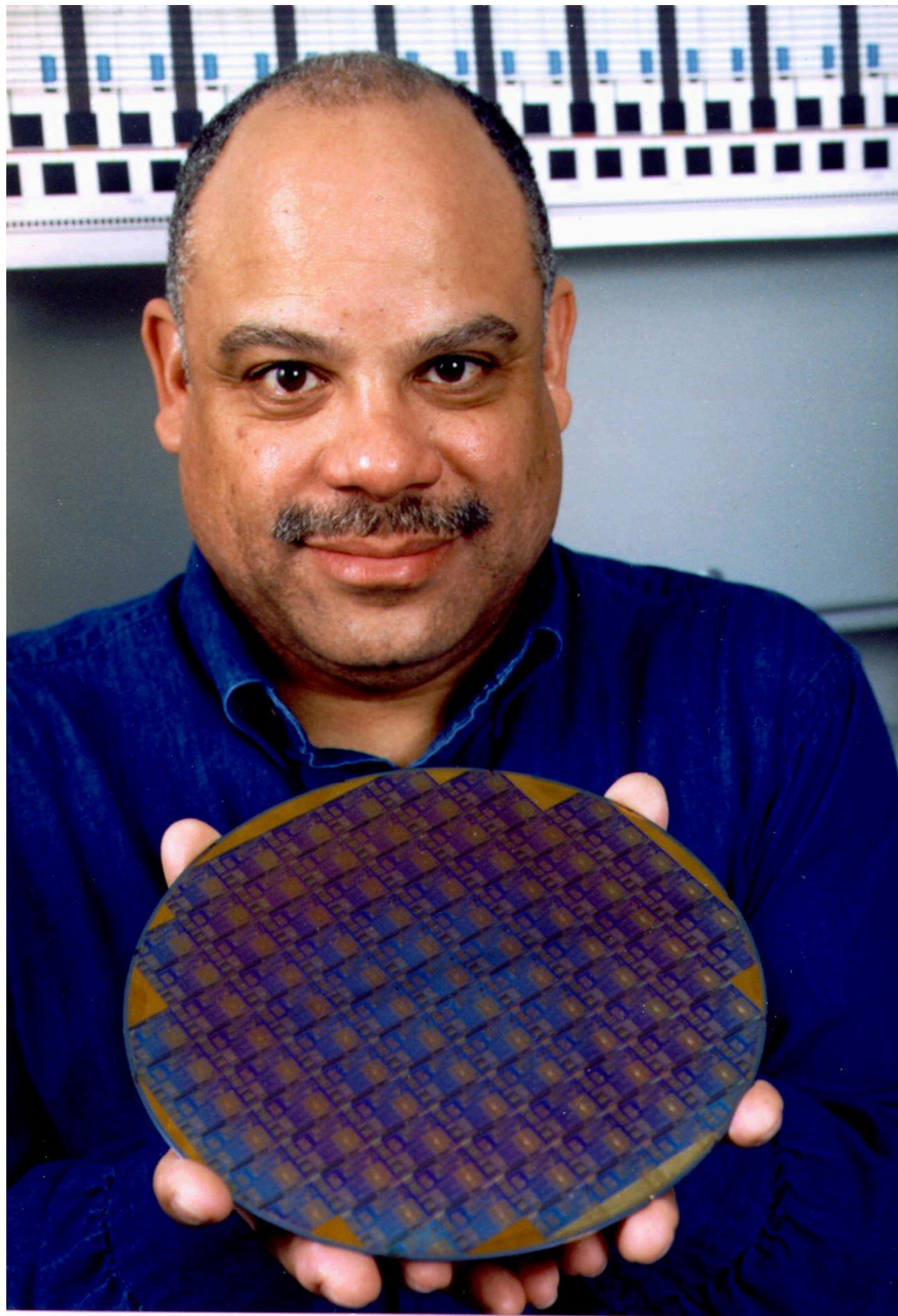


Plotting: name-value pair arguments

- `plot(1:.1:20, sin(1:.1:20), 'o', 'linewidth', 4,
'markeredgecolor', 'r', 'markerfacecolor', 'b',
'markersize', 15);`



Aside: Mark Dean and the first PC + color PC monitor



- Helped developed IBM's first PC
- Holds 3 of IBM's original patents
- Developed interior that enables devices to connect to PCs
- Invented the first color monitor for PC

Mark Dean (1957-), holding the first GHz processor

Plotting: name-value pair arguments

- ‘Color’: change line color, specify by linespec or RGB vals [r g b]
- ‘LineStyle’: type of line (e.g. solid, dashed), specify by linespec
- ‘LineWidth’: width of the line
- ‘Marker’: type of marker (e.g. dot, asterisk, triangle), specify by line spec
- ‘MarkerEdgeColor’: color of marker edge, specify by line spec or RGB
- ‘MarkerFaceColor’: color of marker face, specify by line spec or RGB
- ‘MarkerSize’: size of marker, specify by number

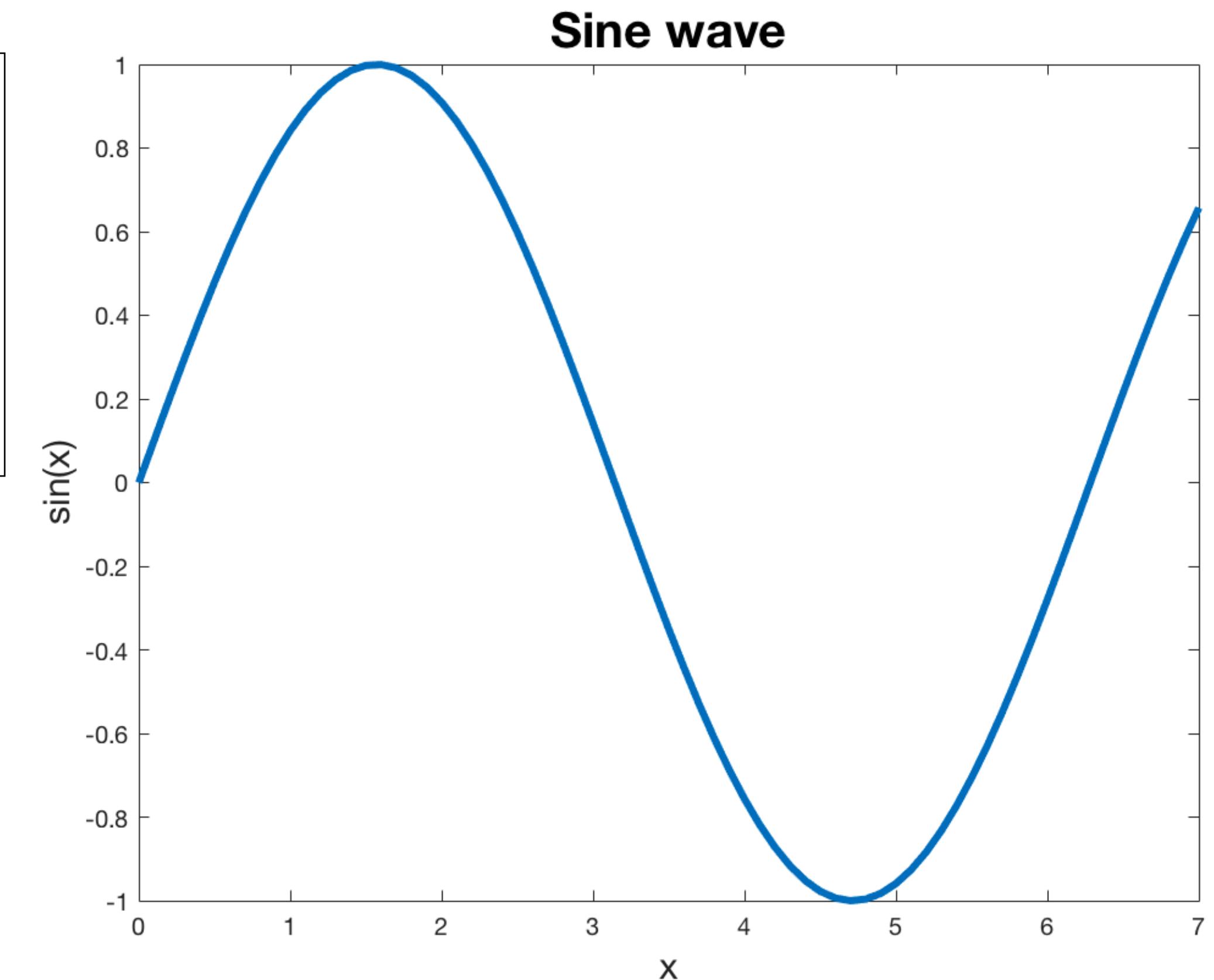
Axes properties

- Change appearance and labels of axes
- Usage: `set(gca, 'propertyName', PropertyValue)`
- Usage: `title('title', 'propertyName', PropertyValue); xlabel('label', 'propertyName', PropertyValue); ylabel('label', 'propertyName', PropertyValue)`

Axes properties

```
figure('color', 'w');
plot(0:.1:7, sin(0:.1:7), 'linewidth', 3);

% add labels
xlabel('x', 'fontsize', 15)
ylabel('sin(x)', 'fontsize', 15)
title('Sine wave', 'fontsize', 20)
```

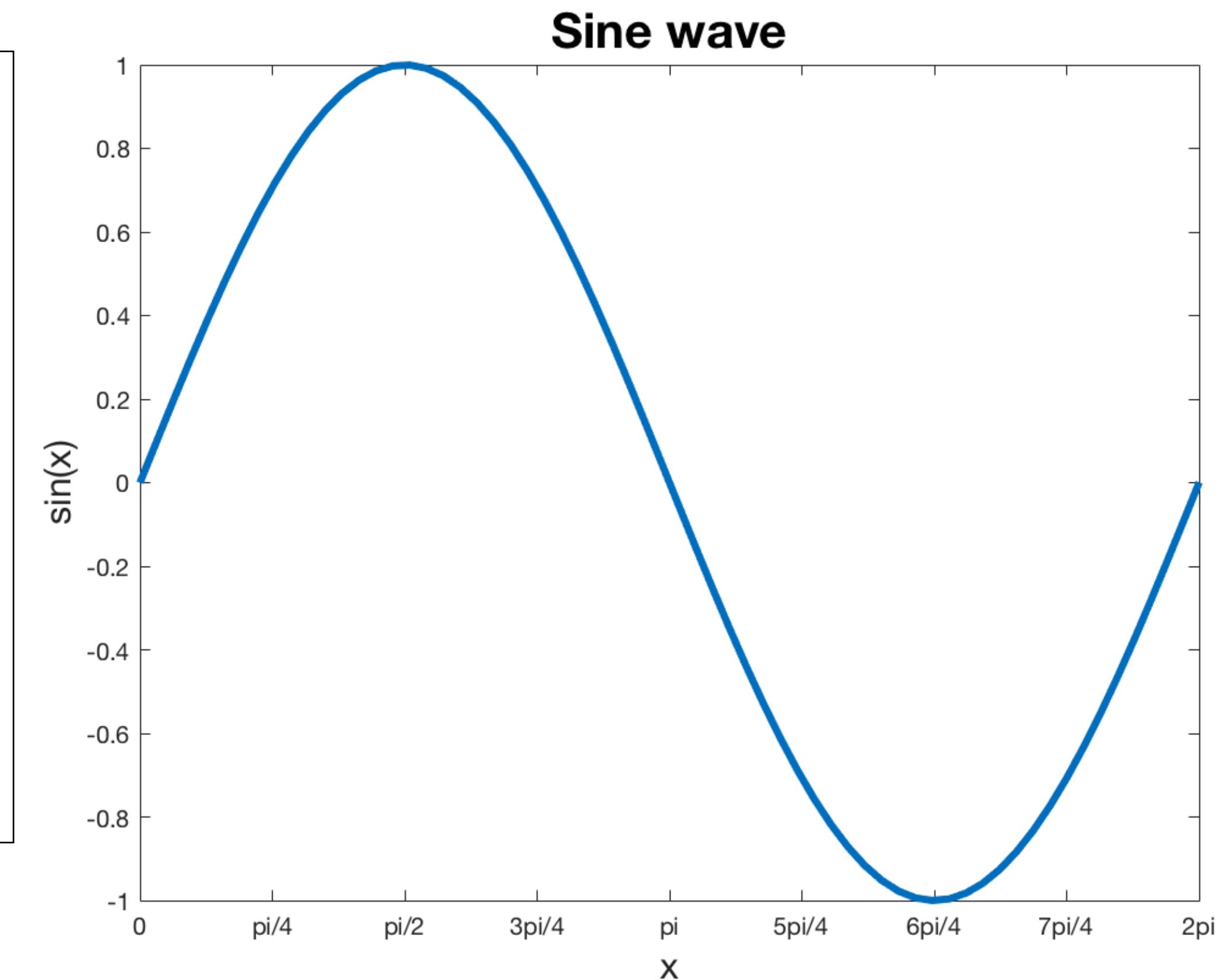


Axes properties

```
figure('color', 'w');
plot(0:.1:7, sin(0:.1:7), 'linewidth', 3);

% add labels
xlabel('x', 'fontsize', 15)
ylabel('sin(x)', 'fontsize', 15)
title('Sine wave', 'fontsize', 20)

% change axes
set(gca, 'xtick', [0, pi/4, pi/2, pi*3/4, pi, pi*1.25, ...
    pi*1.5, pi*1.75, pi*2], 'xlim', [0 2*pi], ...
    'xticklabel', {'0', 'pi/4', 'pi/2', '3pi/4', 'pi', ...
    '5pi/4', '6pi/4', '7pi/4', '2pi'});
```

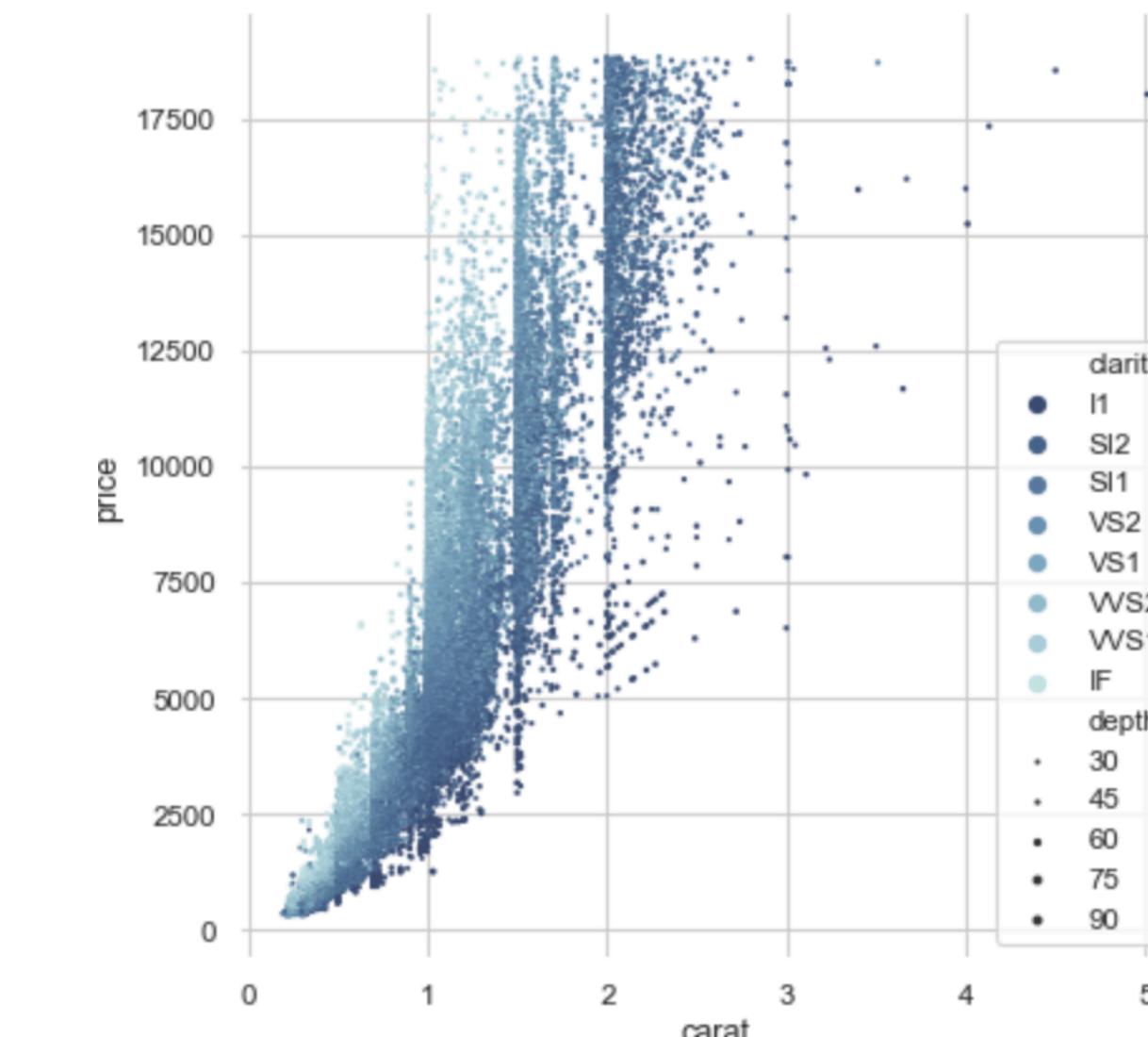


Axes properties

- ‘FontSize’: set font size of tick mark labels
- ‘FontWeight’: set font weight (bold, regular) or tick mark labels
- ‘xtick’, ‘ytick’: vector of values to show tick marks
- ‘xticklabel’, ‘yticklabel’: vector or char array of labels for tick marks
- ‘xlim’, ‘ylim’: [min max] axis to display on figure

Python aside

- matplotlib: designed to replicate MATLAB plotting
 - ref: <https://matplotlib.org/tutorials/introductory/usage.html#sphx-glr-tutorials-introductory-usage-py>
- seaborn: make beautiful, fancy figures. Built on top of matplotlib
 - ref: <https://seaborn.pydata.org/>



HW #3, Problem 1

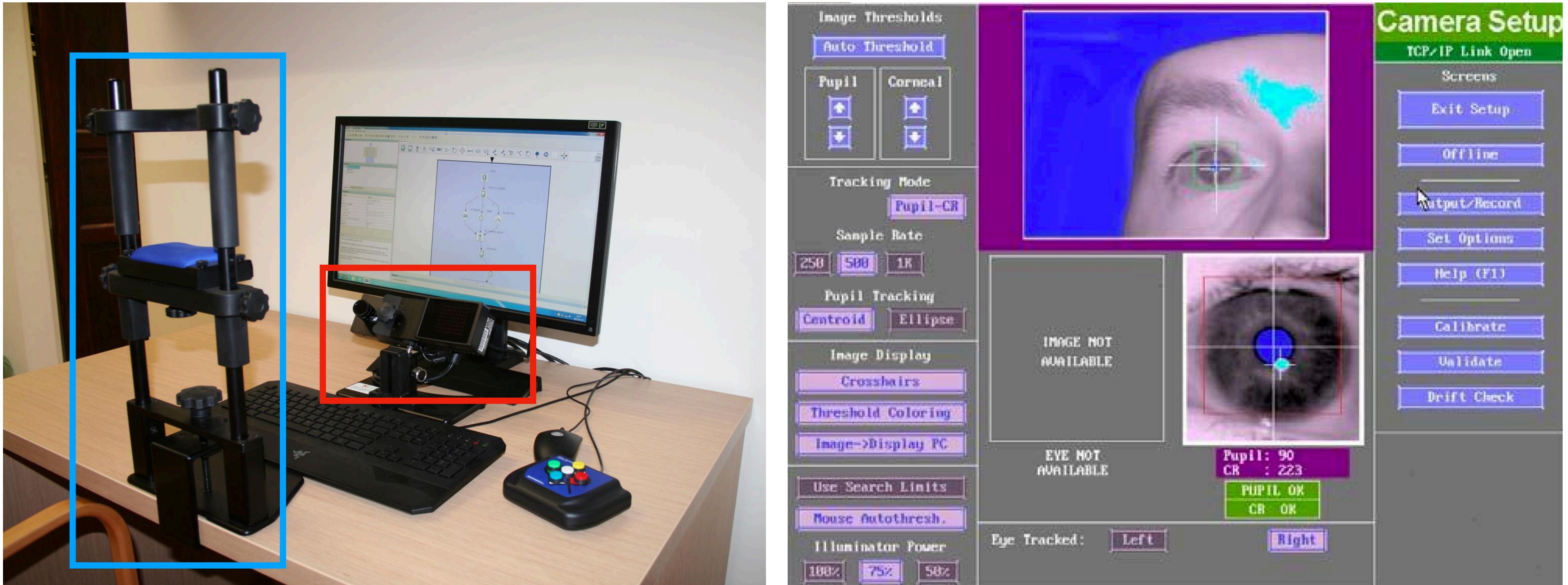
- Visualize sample eye tracking data: where do subjects look while evaluating posters for attractiveness?
- Data from Aaron Kurosu (GS) and Yoko Urano (UG) in Princeton's Todorov Lab

HW #3, Problem 1

- You are constantly moving your eyes to take in the visual world
- **Saccades** are eye movements between **fixations**, which are when your eyes briefly pause on a point (“fixation point”)
 - fastest movement we can make (up to 900 deg/sec)
 - make about 3-5/second (every 200-350 ms)
 - fixation lasts 180-300 ms



HW #3, Problem 1



HW #3, Problem 1

Contact us: hncadmin@shtc.org.uk

Business Networking Black Tie Event

25th May 2013
7pm – 12pm

**The Village Hotel,
Henry Boot Way, Priory Way, Hull
HU4 7DY**


Higher Education Centre

£27.00 Per Person



On behalf of the newly formed HNC group we would like to invite all local businesses, teachers and parents to our Business Networking Black Tie Event in aid of the British Heart Foundation. The event will be held on the 25th May 2013 at the Village Hotel, Hull.

Our event will not only offer your business a unique networking opportunity, but also offers a fun filled night of; a three course sit down meal, disco, charity auction, raffle, and guest speaker. The three course meal consists of; Classic Prawn Marie Rose to start, followed by Roast Beef with Yorkshire pudding, and finished with Vanilla Cream Profiteroles. There will also be a vegetarian option available.

Tickets are available at a price of £27 per person or a discounted price for tables

Please Contact
hncadmin@shtc.org.uk
For any tickets or queries

 Supporting the British Heart Foundation

HW #3, Problem 1

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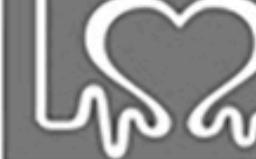
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HW #3, Problem 2

- Visualize fMRI data from 3 ROIs (regions of interest) in an experiment to localize regions of the brain activated during theory of mind
- Data from Yaara Yeshurun, former postdoc at Princeton in Hasson Lab and now professor at Tel-Aviv University.
 - “Same story, different story: the neural representation of interpretative frameworks” <https://journals.sagepub.com/doi/10.1177/0956797616682029>

HW #3, Problem 2

- **Theory of Mind:** making inferences about other people's minds; making attribution of mental states to other people
- **Theory of Mind Localizer** (Dodell-Feder et al., 2011)
 - Localizer = term used in fMRI referring to an experiment to find “location” in the brain that does some task/cognitive thing
 - Compare neural response when people make judgements requiring Theory of Mind (Belief condition) versus judgements that don’t (Photo condition)

HW #3, Problem 2

The morning of high school dance Sarah placed her high heel shoes under her dress and then went shopping. That afternoon, her sister borrowed the shoes and later put them under Sarah's bed.

10 seconds

HW #3, Problem 2

Sarah gets ready assuming her
shoes are under the dress.

True

False

4 seconds

HW #3, Problem 2



12 seconds

HW #3, Problem 2

Sargent famously painted the south bank of the river in 1885. In 1910 a huge dam was built, flooding out the whole river basin, killing the old forests. Now the whole area is under water.

4 seconds

HW #3, Problem 2

In the painting the south bank of
the river is wooded.

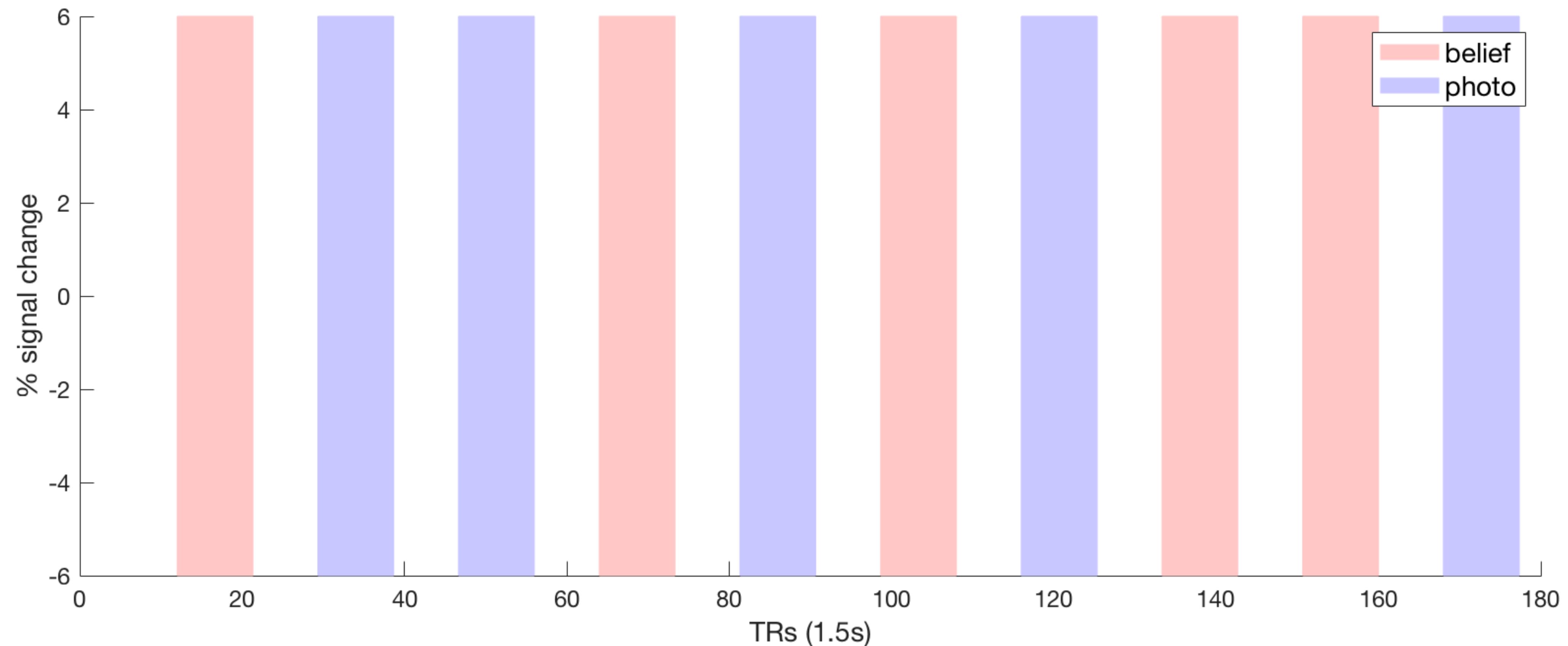
True

False

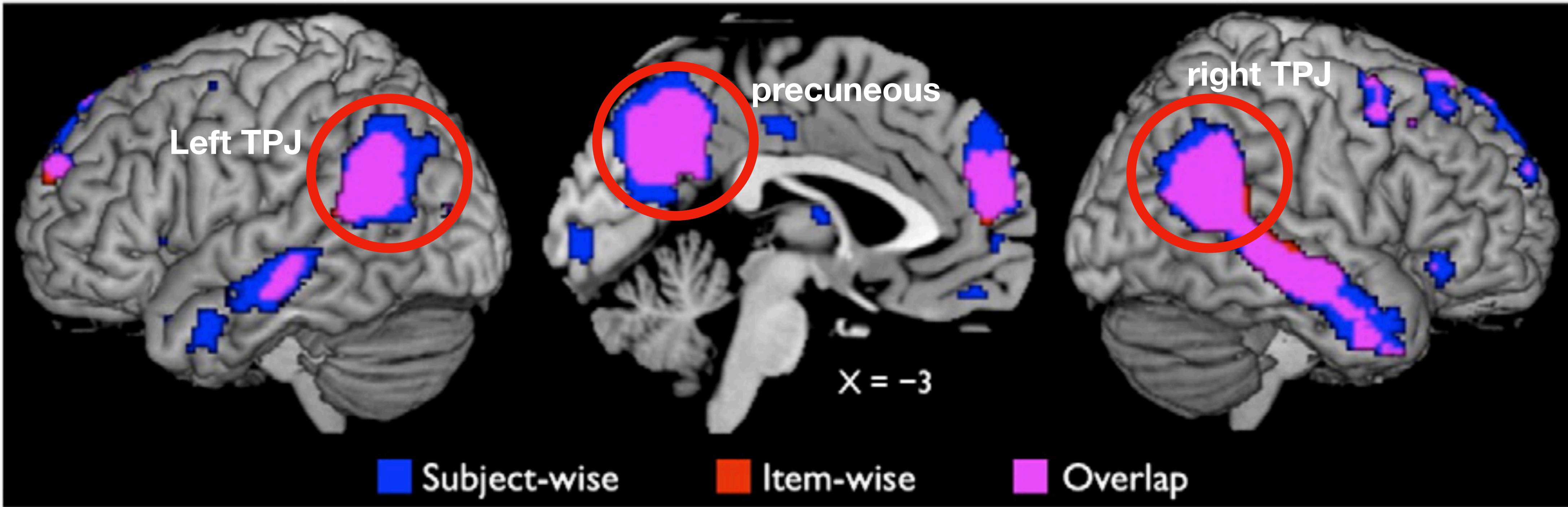
4 seconds

HW #3, Problem 2

- ToM localizer design: “block design”



HW #3, Problem 2



HW #3, Problem 2

