Resource: 4 Generating and exporting figures in MATLAB

Once you've entered your data into arrays in MATLAB, you can easily generate plots with syntax such as:

```
%% fake some data

x = linspace(0,10,50); % dummy independent variable
y = x.^2; % dummy dependent variable
z = y+sin(y); % another dummy dependent variable

%% plot

figure % opens a new figure
plot(...
  x,y,... % data
  'bx'... % LineSpec
);
hold on % Hodor figure for more plots
plot(...
  x,z,... % more data
  'ro'... % LineSpec
);
hold off % Hodor is sacrificed
grid on % turn on grid
xlabel('R_i (M\Omega)')
ylabel('voltage (V)')
legend(... % add a legend!
  'first data',... % label for first trace
  'second data'... % label for second trace
)
```

For more details on the appearance of plot traces, called `LineSpec` in MATLAB, see its documentation here:

`mathworks.com/help/matlab/ref/linespec.html`.

So you have your plot, but how do you get it into your LaTeX report? You need to export it from MATLAB as a pdf. The advantage of using a pdf and not a rasterized graphic (e.g. jpg) is that the quality of the output is "vector" and doesn't look pixelated. However, if you use MATLAB's

GUI interface to export the figure, you'll be disappointed to find it yields full-page figures—hardly conducive to including in your report!

Fortunately, there's a nice function `save2pdf` available here:

`ricopic.one/courses/me316_2018F/resources/save2pdf.m`.

The following procedure will get you started with this function.

- ☐ 1. Download the m-file (`save2pdf.m`) with the link, above.
- ☐ 2. Copy `save2pdf.m` to the same directory as your main MATLAB m-file. The function `save2pdf` is now available to your main MATLAB m-file.
- ☐ 3. Use the following command in your main MATLAB m-file to save the most recently generated figure (`gcf`) to a pdf. This will save the figure as the file `figure-file-name.pdf` in your current directory.

```
save2pdf('figure-file-name',gcf,300)
```

- ☐ 4. After each figure you'd like to save, call the `save2pdf` function in the same way, changing the filename, appropriately.

Now your figure is a nice pdf `figure-file-name.pdf`. Upload it to Overleaf and include it in your document in the usual way (`\includegraphics{figure-file-name.pdf}`). For more details, review Resource 1.4.