Intro to MATLAB

FFW Workshop

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What is MATLAB?

- MATLAB is a programming language + user interface.
- Designed for efficient matrix manipulation, data visualization, numerical computation.
- Similar to *R* and Python (SciPy/NumPy).

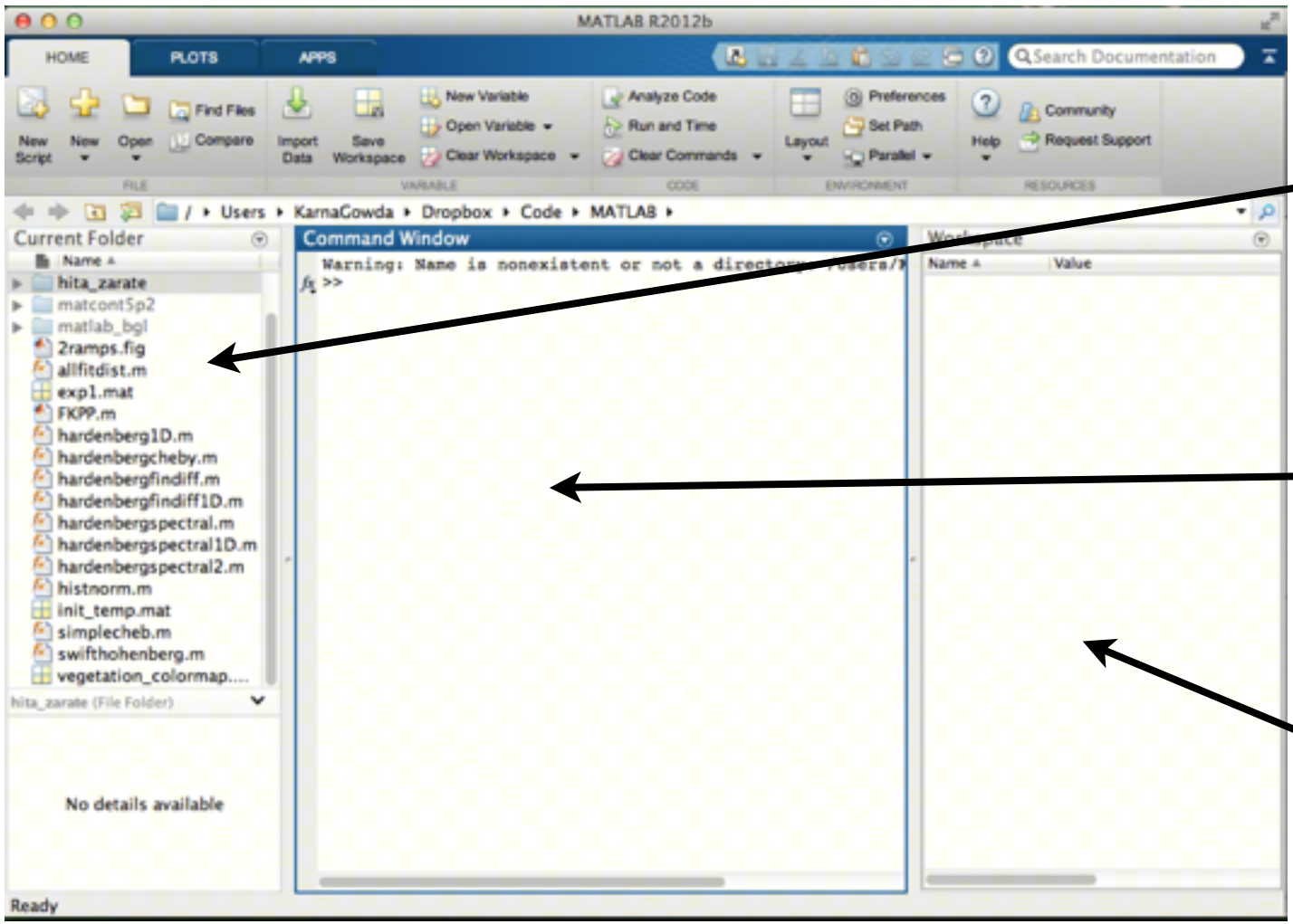
Why use MATLAB?

- MATLAB is flexible. Don't have to worry about variable typing, memory allocation, compile errors. Can go from idea to execution quickly.
- MATLAB is optimized for a lot the things that we as mathematicians like to do. Specifically, it's great at dealing with matrices and arrays.
- MATLAB has support. Lots of help online about how to code or debug something. Lots of built in functions and user-generated packages as well.

How have you used MATLAB?

- To solve ODEs and PDEs numerically.
- To visualize and analyze networks.
- To numerically compute bifurcation diagrams.
- To analyze visual data.

What is all this stuff?



Current directory + files

Type code here to run it realtime

All the variables loaded into memory

How do you speak MATLAB?

% Comments start with percent signs.

- x=1; creates a float variable equal to 1.0. Semicolon ends the statement.
- Spaces and tabs don't matter.
- Code blocks, like for loops, go between the starting word and "end," i.e.

```
for i=1:10
    blah;
end
```

Let's get started.

Resources

- Get MATLAB: http://matlab.it.northwestern.edu/obtain.html
- Support:
  - http://www.google.com/
  - http://www.mathworks.com/help/matlab/index.html
  - http://stackoverflow.com/questions/tagged/matlab
- Performance:
  - http://www.mathworks.com/help/matlab/matlab_prog/techniques-for-improving-performance.html
- User built functions:
  - http://www.mathworks.com/matlabcentral/fileexchange/