MATLAB Exercise 1

Exercise 2

CSC872

Pattern Analysis and Machine Intelligence

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Platforms

- MATLAB
  - MathWorks: http://www.mathworks.com/
  - http://en.wikipedia.org/wiki/MATLAB
- MATLAB @ SFSU
  - https://athelp.sfsu.edu/hc/en-us/articles/360011475074-Getting-MATLAB-for-students
- MATLAB clones
  - Octave: https://octave.org/
  - SciLab: https://www.scilab.org/
  - Various tutorials available online
  - https://matlabacademy.mathworks.com/?s_tid=acb_tut

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GUI & Help

- GUI: *Home:Layout:Default*
  - Command Window: command line
  - Command History
  - Current Folder
  - Workspace: memory
- Help:
  - >> help (e.g., >>help help)
  - >> doc (e.g., >>doc help)
  - DEMOs

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Basic operations

- Arithmetic: + - / *
- ;
- Variable
- +=?
- Rounding: round, sign
- Built-in functions
- >> pi, exp, log, cos, sin, sqrt

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Data type

- Variables: Creation/Workspace
- How to check the type: >> whos
- Type casting: >> double, uint8, uint16
- Loading and saving data: >> load, save
- Clearing workspace: >> clear

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Vectors

- Create & View vector: use brackets
- Transpose
- Colon operator, :, 1:2
- Accessing elements
- Vector operations: dimensions
- >> size
- >> length
- >> mean
- >> std
- >> sum
- >> sort

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Matrix

- Create matrix
- Transpose
- Matrix operator: inv, eig etc.
- Reference/Vectorization: M(1,2), M(:)
- Matrix operations: *, .*
- >> rand, randn
- >> ones
- >> zeros
- >> eye
- >> size, length, max, min, diag

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Plotting

- Plot
- Hist
- Mesh
- Surf

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Figure

- >> figure, h = figure(1)
- >> hold
- >> grid
- >> title
- >> xlabel, ylabel
- >> legend
- >> axis
- >> subplot
- >> print/save

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Exercise

- Make a random matrix
- Modify the matrix arithmetically
- Create a vector from the matrix
- Sort the vector & plot it in a figure
- Make a plot of tangent curve.
- Make a histogram and display it in a figure
- Save the figure into a file and view it in an imaging software

Useful MATLAB Codes: Matrix Op

- C = vertcat(A,B) (C = [A;B])
- C = horzcat(A,B) (C = [A B])
- m = mean(X): a mean vector of input row-sample matrix
- M = repmat(m,N,1): create a row matrix with the mean
- C = cov(X): covariance matrix of input row-sample matrix
- [V D] = eig(C) eigen value decomposition