

Matlab Introduction

Going to use Matlab extensively for implementing image processing algorithms. The purpose of this first exercise is to refresh some basic Matlab skills.

Complete the following exercises in Matlab:

1. Construct a 10x10 matrix such that the diagonal elements get the value of the indices (eg. index (3,3) gets the value 3), and the element with index (10,1) gets the value 5. If you need help for this exercise, download and print the *Matlab Primer* (available from module webpage). The *Primer* contains a good introduction to basic manipulation of matrices in Matlab.
2. Extract the 2,3 and 7 column from the matrix with one command.
3. What is the expected result of matrix multiplication and element-wise multiplication of this matrix with itself ? Confirm your expectations using Matlab. What is the general operator for element-wise operations in Matlab?
4. Show the original matrix as an image.

Try `help image`, `help imagesc`, `help imshow` — what is the difference? What does `axis image` do? Try using the function `colormap`.

5. Describe the following coordinate systems: Matrix coordinates, Mathematical cartesian coordinates, and Matlab image coordinates.

For each you must point out where the coordinates (10,1) is located in a 10x10 coordinate frame. Are there any differences? Which coordinate system do you prefer?

6. Add noise to the image Use the Matlab `helpdesk` to search for functions that generate random noise. Display the original matrix with noise added.

7. Try the demos for the Matlab Image Toolbox in order to get a feeling for what you can get Matlab to do. Start them by the Matlab command `demo` and look under the Image Processing Toolbox.