

# MATLAB: Introduction

## Part 1 – Assignment

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Assigned: September 8<sup>th</sup>, 2011

**Due: September 15<sup>th</sup>, 2011**

This assignment will **not** be graded; therefore, it is optional. Use it as a form of exercising what we covered in class. It is recommended that you create a function or script M-file with code cells corresponding to the problems and/or their parts (let us call it *main* M-file). This function or script can then call other M-files or subfunctions. Publish your *main* M-file to HTML. Finally, compress all the necessary files into a `.zip` or `.tar` file and e-mail it to me at [bacalfa@cmu.edu](mailto:bacalfa@cmu.edu).

### Problem 1

Calculate the value of the function  $y(x) = |x| \sin x^2$  for values of  $x = \frac{\pi}{3}$  and  $\frac{\pi}{6}$ .

**Hint 1:** Use the MATLAB command `abs(x)` to calculate  $|x|$ .

**Hint 2:** You do not have to create a subfunction or a function M-file for this problem if you do not want to.

### Problem 2

Create the following vectors and matrices and perform the operations.

**Hint 1:** Create variables to store the vectors and matrices to help you do the calculations.

**Hint 2:** Use the command `eye(n)` to create an  $n$ -by- $n$  identity matrix.

(a)

$$\begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix} + \begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix} = \begin{bmatrix} ? \\ ? \\ ? \end{bmatrix}$$

(b)

$$3 [2.6 \quad 3.5 \quad -8.9] \begin{bmatrix} -2 \\ -9 \\ 5 \end{bmatrix} - \frac{4}{3} = ?$$

(c)

$$\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} -1 \\ 1 \end{bmatrix} + 0.7 \begin{bmatrix} \frac{1}{3} \\ -\frac{1}{6} \end{bmatrix} = \begin{bmatrix} ? \\ ? \end{bmatrix}$$

(d)

$$\left( \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 10 \\ 0 \\ 5 \end{bmatrix} \right)^T - [2 \quad -5 \quad 1] \begin{bmatrix} 4 & 2 & -5 \\ 2 & 1 & 3 \\ -5 & 3 & 2 \end{bmatrix} = [? \quad ? \quad ?]$$

### Problem 3

Evaluate the function

$$f(x) = \frac{x^2 \cos \pi x}{(x^3 + 1)(x + 2)}$$

for the following cases:

(a)

$x \in [0, 1]$  in steps of 0.01

(b)

100 linearly-spaced values of  $x$