

Homework Assignment #2

Due 9:10am Jan 19 (F)

Read Chapter 2 in the book through Section 2.4 (Pg35-58) and work through the examples and Practice problems given in the book. You do not have to submit any of this work.

1. For each of the following math expressions, use MATLAB to calculate the result for the given variable values. To be more general, each math expression should be defined using the variables.

1) $3\cos(2\pi\omega t + 50^\circ)$ when $\omega=1000\text{rad/second}$ and $t=10\text{ second}$

2) $10\log_{20}\left(\left|\frac{V_o}{V_i}\right|\right)$, when $V_o=100\text{volts}$ and $V_i = 1\text{volt}$;

3) $e^{-\frac{t}{RC}} - 1$, when $t=1\text{second}$; $R = 1000\text{ohms}$ and $C=0.001\text{Farad}$;

4) $\sqrt[3]{a^{2.2^3} + b^{\frac{2}{3}}}$, when $a=2$ and $b=3$;

2. Create each of the following row vectors using two methods: the colon operator and the **linspace** function:

1) $[-5 \quad -4 \quad -3 \quad -2 \quad -1]$

2) $[10 \quad 8 \quad 6 \quad 4]$

3. Write an expression that refers to only the odd-numbered elements in a vector, regardless of the length of the vector. Write another expression that refers to only the even-numbered elements in a vector, regardless of the length of the vector.

Test your expressions on the following two vectors

1) $[4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11]$

2) $[0 \quad \frac{\pi}{2} \quad \pi \quad \frac{3\pi}{2} \quad 2\pi]$

4. Create a vector x which consists of 20 equally spaced points in the range from $-\pi$ to $+\pi$. Create a y vector which is **sin(x)**.
5. Create a variable *rows* that is a random integer in the inclusive range from 1 to 5; create a variable *cols* that is a random integer in the inclusive range from 1 to 5; then create a matrix in a variable named A of random real numbers in the inclusive range from -1 to +1 with the dimensions given by the values of *rows* and *cols*. Then reverse the order of every odd-numbered row and store the resulting matrix in a new variable named B . Your statement should be general. For example: if *rows* = 5; and *cols* = 5; and

A=

-0.0205	-0.4479	-0.0033	0.5025	0.9186
-0.1088	0.3594	0.9195	-0.4898	0.0944
0.2926	0.3102	-0.3192	0.0119	-0.7228
0.4187	-0.6748	0.1705	0.3982	-0.7014
0.5094	-0.7620	-0.5524	0.7818	-0.4850

Then

B =

0.9186	0.5025	-0.0033	-0.4479	-0.0205
-0.1088	0.3594	0.9195	-0.4898	0.0944
-0.7228	0.0119	-0.3192	0.3102	0.2926
0.4187	-0.6748	0.1705	0.3982	-0.7014
-0.4850	0.7818	-0.5524	-0.7620	0.5094

Test your solution using two different A matrices, one with an odd-number of rows and the other with an even-number of rows. Use the same set of commands for both cases.