**DA-IICT**

**CT215 LAB1**

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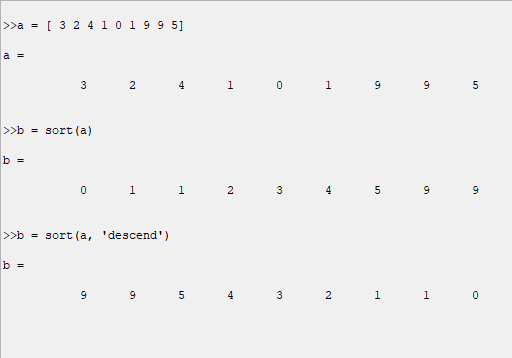
**ID: 201901306**

**Date: 31 January 2021**

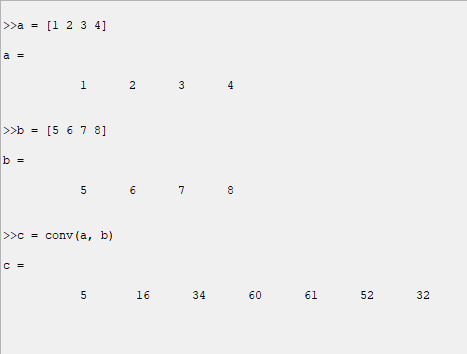
**EXRCISES**

**[A] Few Basic LabView Commands:**

1. **sort(a, order):** It sorts the matrix column wise. Here, “a” is a matrix or a vector. And “order” specifies the ascending/ descending order of sorting in which we want to sort the given vector. If we don’t specify the order then by default sorting order is ascending order.

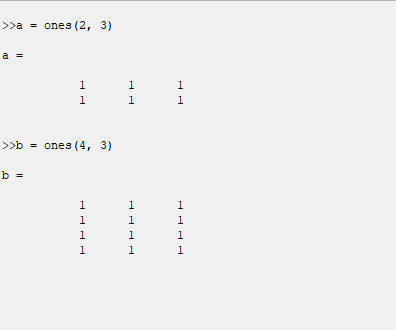


1. **conv(a, b):** It computes convolution of two matrices or vectors. And gives result of convolution theory of two signals. If “b” is not specified then it gives the auto-convolution i.e., conv(a, a).



**(3) ones(a, b):** It returns a matrix of ones of size a x b

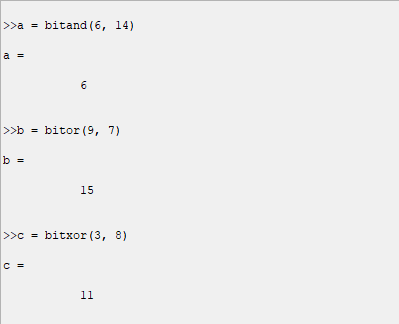
**zeros(a, b):** it returns a matrix of zeros of size a x b. (#Rows = a & #Columns = b)



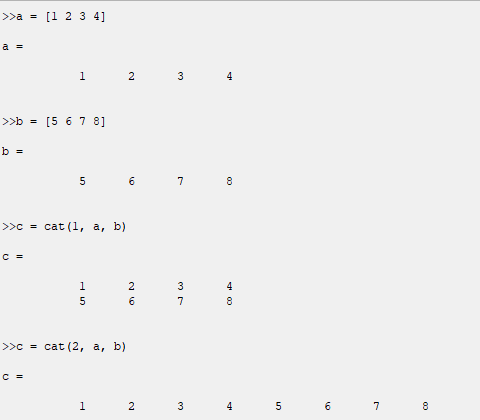
**(4) bitand(a, b):** It computes bitwise AND operation between a and b.

**bitor(a, b)**: It computes bitwise OR operation between a and b.

**bitxor(a, b):** It computes bitwise AND operation between a and b. (All of these bitwise functions return respective answer in the decimal.)



**(5) cat(type, a, b):** It concatenates two matrices or vectors a and b. If we want to concatenate more than two matrix then use cat(1,a,b,c, ……). Here, type “1” specifies column wise concatenation and type “2” specifies row wise concatenation.



**[B] Compute the Fourier transform (FT) of the signal g(t) = exp(−2t)u(t), where u(.) is the unit step function.**

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**[C] Next Consider the following code which computes the FT of g(t) (given above) using the FFT method in MathScript. Understand what each and every command is doing (there might be a few new ones):**

**CODE:**

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| --- |
| clear all;  clc;  t\_s=0.01;  t=0:t\_s:10;  exp\_t=t\_s\*exp(-2.\*t);  fft\_exp\_t=fftshift(fft(exp\_t));  mag\_exp\_t=abs(fft\_exp\_t);  phase\_exp\_t=angle(fft\_exp\_t);  figure(1);  stem(mag\_exp\_t);  title('Plot of Magnitude Response of the given signal')  figure(2);  stem(phase\_exp\_t);  title('Plot of Phase Response of the given signal') |

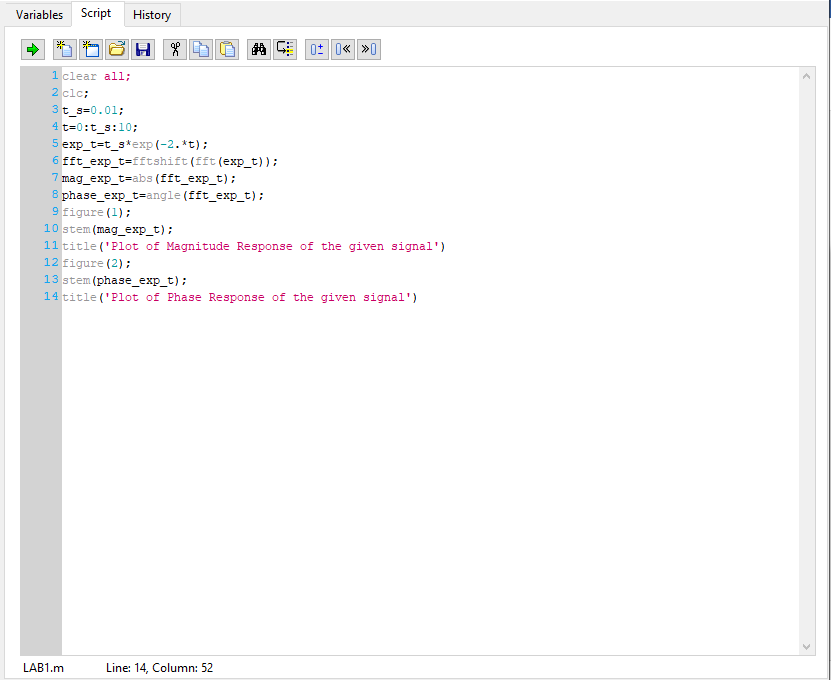
In the above code,

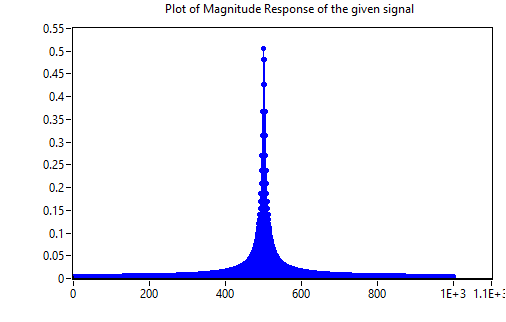
• t\_s is the sampling interval, because g(t) is the continuous signal and it can not be stored. So, we have stored its samples. And t is the total time.

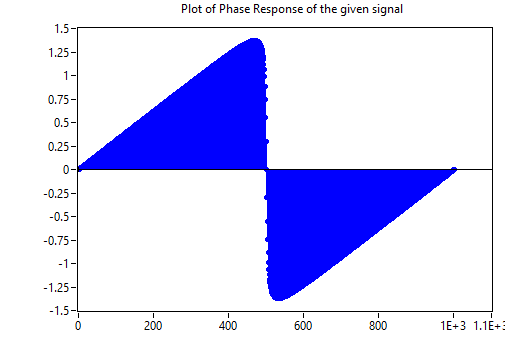
• fft() function (Fast Fourier Transform) computes the DFT (Discrete Fourier Transform) of the given signal g(t). And fftshift() function rearranges the array obtained from the fft() function such that 0 frequency sample is at the center of the array.

• abs() and angle() functions compute the magnitude and the phase respectively.

• figure(), stem() and title() functions are for plotting.







And from the above two plots,

• g(t) is real valued continuous time signal, as the magnitude response of g(t) is an even function and the phase response of g(t) is an odd function.