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Description automatically generated

**AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)**

FACULTY OF ENGINEERING

Course name: Data Communication

Course code: COE 3201

Section: H

Semester: Spring 2023-24

Name: MD. ABU TOWSIF

ID: 22-47019-1

Instructor name: Dr. Muhammad Morshed Alam

Experiment no: 01

Experiment name: Introduction to MATLAB

Submission date: Feb 9th, 2024

**Performance Task for Lab Report: (your ID = AB-CDEFG-H**)

\*\*Generate two CDEF hertz sinusoids with different amplitudes and phases.

x1(t) = A1 cos(2π(CDEF)t + j1) x2(t) = A2 cos(2π(CDEF)t + j2)

(a) Select the value of the amplitudes as follows: let A1 = AB and A2 = GH. For the phases, use j1

= DG (in degrees), and take j2 = 30º. When doing computations in Matlab, make sure to convert

degrees to radians.

**ANSWER:**

My ID is : 22-47019-1

AB-CDEFG-H. So,

AB = 22 = A1,

GH = 91 = A2

CDEF = 4701 = f

DG = 79 = J2

J2 = 30

(b) Make a plot of both signals over a range of t that will exhibit approximately 3 cycles. Make

sure the plot starts at a negative time so that it will include t = 0, and make sure that you have at

least 20 samples per period of the wave.

**ANSWER:**

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| MATLAB Code | Output Figure |
| % ID = 22-47019-1 AB = 22, GH = 91, CDEF = 4701, DG = 79  t = linspace(-5, 5,80);  % 80 samples  CDEF = 4701;  A1 = 22; %AB  phase\_degree1 = 79; %j1  phase\_rad1 = deg2rad(phase\_degree1); %j1  x1 = A1\*sin(2\*pi\*CDEF\*t + phase\_rad1);  figure;  plot(t, x1, 'r')  xlabel('t')  ylabel('X1')  title('sin function')  grid on;    % ID = 22-47019-1 , AB = 22, %GH = 91, CDEF = 4701  A2 = 91; %GH  phase\_degree2 = 30;% j2  phase\_rad2 = deg2rad(phase\_degree2); %j2  x2 = A2\*cos(2\*pi\*CDEF\*t + phase\_rad2); % Here phase\_rad2 = j2  figure;  plot(t, x2)  xlabel('t')  ylabel('X2')  title('cosine function')  grid on; |  |

(c)Verify that the phase of the two signals x1(t) and x2(t) is correct at t = 0, and also verify that

each one has the correct maximum amplitude.

**ANSWER:**

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(d) Use subplot(3,1,1) and subplot(3,1,2) to make a three-panel subplot that puts both of

these plots on the same window. See help subplot.

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(e) Create a third sinusoid as the sum: x3(t) = x1(t) + x2(t). In Matlab this amounts to summing the

vectors that hold the samples of each sinusoid. Make a plot of x3 (t) over the same range of time

as used in the previous two plots. Include this as the third panel in the window by using subplot

(3,1,3).

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(f) Measure the magnitude and phase of x3 (t) directly from the plot. In your lab report, explain how the magnitude and phase were measured by making annotations on each of the plots

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