Bangladesh University of Engineering and Technology

Numerical Technique Laboratory

EEE 212

Experiment No.: 05

Name of the Experiment: Solution of Simultaneous Linear Algebraic Equations

Department: EEE

Section: C1

Group: 01

Student No.: 1406131

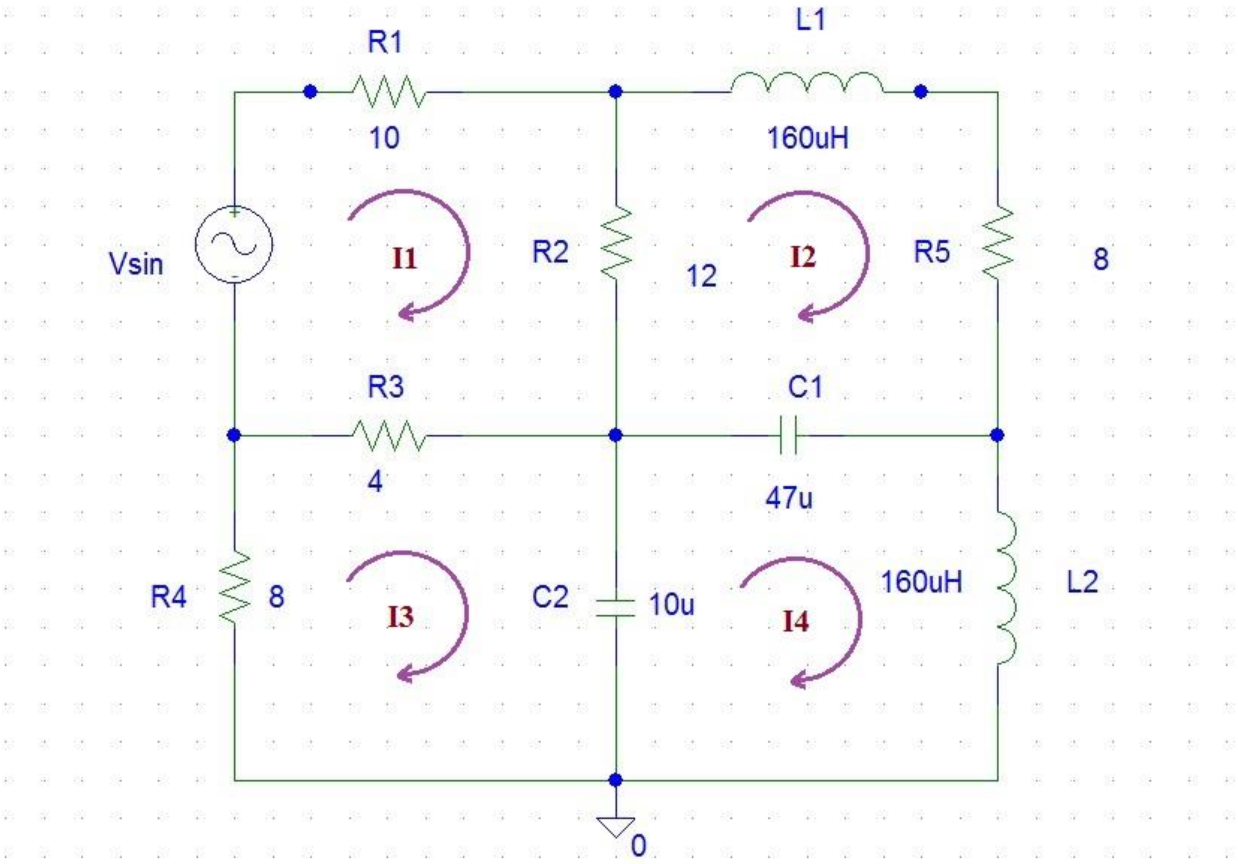
1406132

Date of Performance: October 1, 2016

Date of Submission: October 14, 2016

Solving AC Circuit using MATLAB

Schematics of the Circuit:



We will find out mesh current using MATLAB.

Code:

```
clear all ;
clc , close all ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Ac Circuit Solve

Vs = input('Enter the magnitude and Phase angle of Voltage source : ' ) ;
fprintf('Voltage Source = %d<%d \n' , Vs(1) , Vs(2) ) ;
f = input('Enter the frequency : ') ;
fprintf('Frequency : %d Hz\n', f) ;

% converting r<theta into a+bi form
m = Vs(1) * cosd(Vs(2)) ;
n = Vs(1) * sind(Vs(2)) ;
v = complex(m,n) ;
```

```
matrix=[ 26    -12                          -4               0 ;
        -4     0                            12-(16000j/f)    (16000j/f) ;
        -12    20-(-(.00101j)*f+(3390j/f))   0                (3390j/f) ;
   0     3390j/f                        (16000j/f)      -(19390j/f)+.00101j*f];

B = [ v ; 0 ; 0 ; 0 ] ;



%   ########################   %
% Solution using x = A\B formula


x = matrix\B ; % x = mesh current
fprintf('\n') ;
disp('Mesh Current');
% Displaying Current
for i = 1 : length(x)
    fprintf('I%d',i) ;
    disp(x(i)) ;
    fprintf('\n') ;
end
% Current in Phasor form
for i = 1 : length(x)
    fprintf('\nI%d = %.2f>%.2f\n',i , abs(x(i)),angle(x(i)) ) ;
end




%   ########################   %
% Solution using x = pinv(A)*B formula


current = pinv(matrix) * B ;
% Displaying current
x = current ;
for i = 1 : length(x)
    fprintf('\nI%d = %.2f>%.2f\n',i , abs(x(i)),angle(x(i)) ) ;
end
```


```
%     ############################      %
% Solution using Gauss Jordan Elimination


a = matrix ;
b = B ;
aug = [ a  b ] ;
n = length (a) ;
r = 0 ;
for row = 1 : n - 1
    c = aug(row:end,row) ;
    maxx = max(abs(c)) ;
    max_row = find ( c == maxx ) + r ;
    r = r+ 1 ;
    aug([row max_row] , : ) = aug([max_row row] , : ) ;
    for col = row+1 : n
       multiplier = aug(col,row) / aug(row, row) ;
       subtructor = aug(row,: ) .* multiplier ;
       aug(col , : ) = aug(col, : ) -  subtructor ;
    end
end

row = n ;
x = zeros(1,n) ;
while row > 0
    sum = aug(row,n+1) ;
    for col = 1 : n
        if row~= col
            sum = sum - aug(row,col) * x(col) ;
        end
        x(row) = sum / aug(row, row) ;
    end
    row = row - 1 ;
end
x = x' ;
disp('Mesh current Using Gauss Jordan Elimination') ;
for i = 1 : length(x)
    fprintf('\nI%d = %.2f>%.2f\n',i , abs(x(i)),angle(x(i)) ) ;
end
```

Output:

Mesh current by using (X=A\B) formula:

```
Command Window
Enter the magnitude and Phase angle of Voltage source : [40 60]
Voltage Source = 40<60
Enter the frequency : 1000
Frequency : 1000 Hz

Mesh Current
I1   1.1763 + 1.9505i


I2   0.6907 + 1.1462i


I3   0.5740 + 0.5794i


I4   0.6270 + 0.7158i
```

In r<Θ form:

```
Command Window

I1 = 2.28>1.03

I2 = 1.34>1.03

I3 = 0.82>0.79

I4 = 0.95>0.85
```

Mesh current using (X=pinv(A)*B) formula :

```
Command Window

I1 = 2.28>1.03

I2 = 1.34>1.03

I3 = 0.82>0.79

I4 = 0.95>0.85
```

Mesh Current using Gauss Jordan Elimination: