

## MACHINE EXERCISE 2: VECTOR NORMS

As a student of the University of the Philippines, I pledge to act ethically and uphold the values of honor and excellence.

I understand that suspected misconduct on this Assignment will be reported to the appropriate office and if established, will result in disciplinary action in accordance with University rules, policies, and procedures. I may work with others only to the extent allowed by the Instructor.

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**Write a MATLAB code that determines the  $L_1$ ,  $L_2$ , and  $L_\infty$  norms of a given vector. Paste here the code and a sample run (screenshot) of your code.**

code:

```
function [L_1, L_2, L_inf] = MachineExercise2(A)

s = length(A);

L_1 = 0;
L_2 = 0;
L_inf = -inf;

for i = 1:s
    value = A(i);
    L_1 = L_1 + value;

    L_2 = L_2 + value^2;

    if value > L_inf
        L_inf = value;
    end
end

L_2 = sqrt(L_2);
```

```
A = [1, 2, 3, 4, 5];
```

```
[L1, L2, Linf] = MachineExercise2(A);
```

```
% Display the results
```

```
fprintf('L1 norm: %.2f\n', L1);  
fprintf('L2 norm: %.2f\n', L2);  
fprintf('L $\infty$  norm: %.2f\n', Linf);
```

Screenshot:

```

3
4 % Check if the folder is already in the search path
5 if isempty(strfind(currentPath, folder))
6     % If not, add it to the end of the search path
7     addpath(folder);
8 end
9
10 path
11 which MachineExercise2.m -all

```

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```

12 A = [1, 2, 3, 4, 5];
13
14
15 [L1, L2, Linf] = MachineExercise2(A);
16
17 % Display the results
18 fprintf('L1 norm: %.2f\n', L1);
19 fprintf('L2 norm: %.2f\n', L2);
20 fprintf('L $\infty$  norm: %.2f\n', Linf);
21

```

```
C:\Users\Jeryl Salas\AppData\Local\Temp\Edi  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
C:\Program Files\MATLAB\R2023b\toolbox\matl.  
  
C:\Users\Jeryl Salas\Documents\ES 204 Numerical Metho
```

C:\Users\Jeryl Salas\Documents\ES 204 Numerical Metho

```
L1 norm: 15.00
L2 norm: 7.42
L $\infty$  norm: 5.00
```

```
1 function [L_1, L_2, L_inf] = MachineExercise2(A)
2
3     s = length(A);
4
5     L_1 = 0;
6     L_2 = 0;
7     L_inf = -inf;
8
9     for i = 1:s
10         value = A(i);
11         L_1 = L_1 + value;
12
13         L_2 = L_2 + value^2;
14
15         if value > L_inf
16             L_inf = value;
17         end
18     end
19
20     L_2 = sqrt(L_2);
21
22
```