

CSE 330
Assignment-2
Total Marks: 20

Note: All the calculations of CSE330 course must be done with radian mode of calculator.

1. Consider the following table of data points/nodal points:

Time (sec) t	Velocity (ms^{-1}) $v(t)$
2	10
4	20
6	25

- a) [4+1 marks] Find an interpolating polynomial of velocity that goes through the above data points by using **Vandermonde Matrix** method. Also compute an approximate value of acceleration at Time, **$t=7$ sec.**
- b) [4 marks] Find an interpolating polynomial of velocity that goes through the above data points by using **Lagrange** method.
- c) [1 mark] If a **new data point** is added in the above scenario, which method you should use in finding a new interpolating polynomial. Also what will be the degree of that new polynomial?

2. Read the following and answer accordingly:

- (a) (4 marks) Consider the nodes **$[-\pi/2, 0, \pi/2]$** . Find an interpolating polynomial of appropriate degree by using **Newton's divided-difference** method for **$f(x) = x \sin(x)$** .
- (b) (2 marks) Use the interpolating polynomial to find an approximate value at **$\pi/4$** , and compute the percentage relative error at **$\pi/4$** .
- (c) (4 marks) Add a new node **π** to the above nodes, and find the interpolating polynomial of appropriate degree.