

1. You have to write a program which will generate an interpolating polynomials using **Newton's divided difference** interpolating algorithm. You need to do the following task.
- You are given 21 training points and 10 test points. You need to gradually build a polynomial using these training points. The steps are described below.
  1. Take two points and build a polynomial. Find the average percentage of error for the 10 test points and report that error. Then take three points and repeat the task same as before. You should gradually increase the number of points and you need to take all the training points to get the final polynomial.
  2. There is a criteria for selecting points. When you select two points, take the first and last ones. While three, Take the 1<sup>st</sup>, 11<sup>th</sup> and 21<sup>st</sup> (last) point. That means the index difference is equal. So while you take 4 points or more you must maintain approx. equal space among the points.
  3. You need to present graphically your results. You need to show your polynomial and test points. Detailed technique has been demonstrated in the class.

**Range of x :** [-1.1,1.1]

**Training Points:**

(-1.1000,-4.3889490 )

(-0.9900,2.3605635 )

(-0.8800,4.5063561 )

(-0.7700,4.9975215 )

(-0.6600,4.9206573 )

(-0.5500,4.5988108 )

(-0.4400,4.1505193 )

(-0.3300,3.6382593 )

(-0.2200,3.0984539 )

(-0.1100,2.5499517 )

(-0.0000,2.0000000 )

(0.1100,1.4500483 )

(0.2200,0.9015461 )

(0.3300,0.3617406 )

(0.4400,-0.1505310 )

(0.5500,-0.5992186 )

(0.6600,-0.9279431 )

(0.7700,-1.0784081 )

(0.8800,-1.1272524 )

(0.9900,-1.8334962 )

(1.1000,-5.7258890 )

**Test Points:**

(-1.0450 , -0.1689422)

(-0.8556 , 4.6995172)

(-0.6111 , 4.7987782)

(-0.3667 , 3.8134502)

(-0.1222 , 2.6110293)

(0.1222 , 1.3889707)

(0.3667 , 0.1865492)

(0.6111 , -0.8009430)

(0.8556 , -1.1056607)

(1.1000 , -5.7258890)

2. You need to do the same task for the given set of training and test data. But this time you need to use **quadratic splines** to fit the training data.

**Range of x :** [5,13]

**Training Points:**

(5.0000,-1.6352000 )

(6.3333,2.1058667 )

(7.6667,2.2117333 )

(9.0000,0.5000000 )

(10.3333,-1.2117333 )

(11.6667,-1.1058667 )

(13.0000,2.6352000 )

**Test Points:**

(5.6667 , 0.8033333)

(9.6667 , -0.4694667)

(12.3333 , 0.1966667)