Polynomial InterpolationA graph on a graph paper

Description automatically generated

Polynomial Interpolation is allows you to find a polynomial of degree n, that passes through n+1 points

in 2 dimensions.

**Lagrange’s Method.** One way to do this is to find n+1 polynomials that equal 1 at one point (), and equals 0 at other points ().

These polynomials form a basis for **(Why?),** and you can use ’s as the coordinates of the interpolating polynomial in this basis.

**Newton’s Method.** Another way is to do this is iteratively, using a basis of vectors that do not change when adding more points.

Given a polynomial that interpolates n data points, add another polynomial, of degree n, that is zero at the previous n values, and scale it so the new polynomial passes through the new point.

**Convergence?**

As does ? (Can we find a polynomial that perfectly mimics a function over an interval?)

No.

*Then what basis of functions do you need to recreate any continuous function?*

Can we bound the error over an interval? Yes, and there are two interpretations of this error.