

SPLINE INTERPOLATION:

spline interpolation is a form of interpolation where the interpolant is a special type of piecewise polynomial called a spline. That is, instead of fitting a single, high-degree polynomial to all of the values at once, spline interpolation fits low-degree polynomials to small subsets of the values.

$$(x_0, y_0), (x_1, y_1), \dots, (x_n, y_n)$$

LINEAR ITERPOLATION:

linear interpolation is a method of curve fitting using linear polynomials to construct new data points within the range of a discrete set of known data points.

$$f(x) = f(x_0) + \frac{f(x_1) - f(x_0)}{x_1 - x_0}(x - x_0)$$

GENERALIZED:

$$f(x) = f(x_{n-1}) + \frac{f(x_n) - f(x_{n-1})}{x_n - x_{n-1}}(x - x_{n-1})$$

EXAMPLE:

t	v
0	0
1	5
2	9
3	7

$$f(x) = f(x_0) + \frac{f(x_1) - f(x_0)}{x_1 - x_0}(x - x_0)$$

$$= 0 + \frac{5-0}{1-0}(x - 0)$$

$$= 5x$$

$$f(x) = f(x_1) + \frac{f(x_2) - f(x_3)}{x_2 - x_1}(x - x_1)$$

$$= 5 + \frac{9-5}{2-1}(x - 1)$$

$$= 4x+1$$

$$f(x) = f(x_2) + \frac{f(x_3) - f(x_2)}{x_3 - x_2}(x - x_2)$$

$$= 5 + \frac{7-9}{3-2}(x - 2)$$

$$= 13 - 2x$$