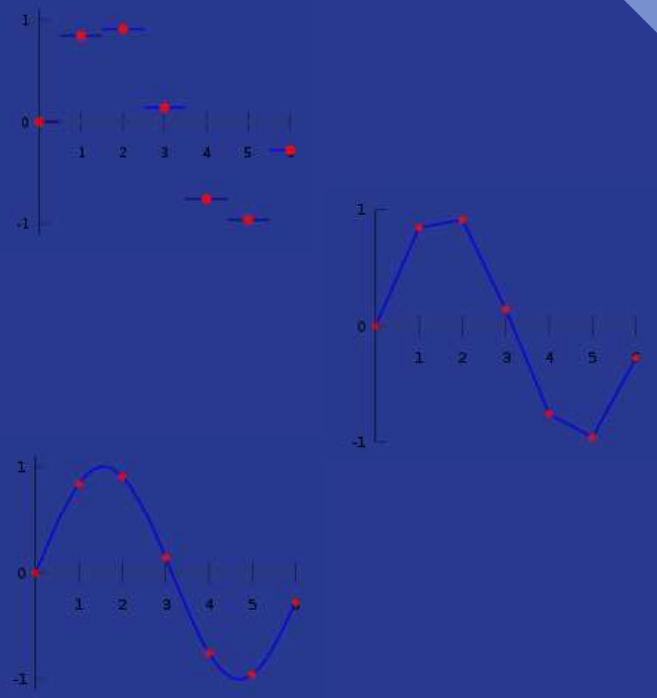
What is Interpolation?

Interpolation is a process of determining the unknown values that lie in between the known data points.

Types of Interpolation

- Piecewise constant interpolation.
- Linear interpolation.
- Polynomial interpolation.
- Spline interpolation.
- Mimetic interpolation.



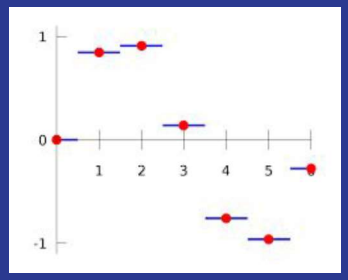
Types of Interpolation

- **Piecewise constant interpolation**
  The simplest interpolation method is to locate the nearest data value, and assign the same value. In simple problems, this method is unlikely to be used, as linear interpolation (see below) is almost as easy, but in higher-dimensional multivariate interpolation, this could be a favourable choice for its speed and simplicity.

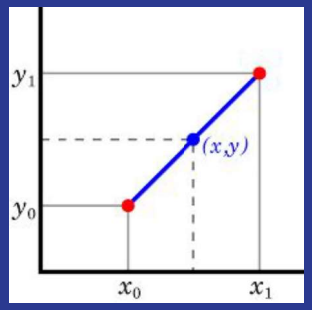
- Linear interpolation.
  Linear interpolation is a method of curve fitting using linear polynomials to construct new data points within the range of a discrete set of known data points.
- Polynomial interpolation.
  Polynomial interpolation is the interpolation of a given data set by the polynomial of lowest possible degree that passes through the points of the dataset.
- Spline interpolation.
  Spline interpolation is a form of interpolation where the interpolant is a special type of piecewise polynomial called a spline.
- Mimetic interpolation.
  Mimetic interpolation is a method for interpolating differential forms. In contrast to other interpolation methods, which estimate a field at a location given its values on neighboring points, mimetic interpolation estimates the field's-form given the field's projection on neighboring grid elements.

Interpolation Graphs

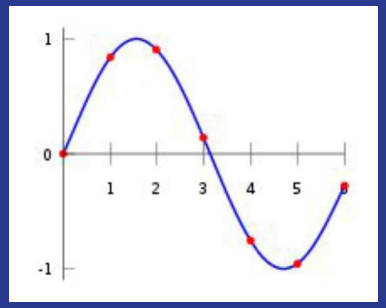
- Piecewise constant interpolation



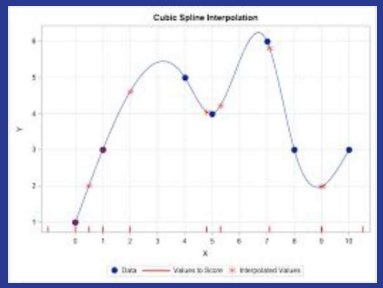
- Linear interpolation



- Polynomial interpolation.



- Spline interpolation.



Advantages

- Can estimate extreme changes in terrain such as: Cliffs, Fault Lines.
- Dense evenly space points are well interpolated (flat areas with cliffs).
- Can increase or decrease amount of sample points to influence cell values.

Disadvantages

- Cannot estimate above maximum or below minimum values.
- Not very good for peaks or mountainous areas.

References

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Thank You!