

Newton's Forward Interpolation Method

Theory:

Newton's Forward Interpolation Method is used when the required value lies near the beginning of a data table. It assumes that the data points are equally spaced and constructs an interpolation polynomial using forward differences.

The forward interpolation formula is

$$y = y_0 + u\Delta y_0 + \frac{u(u-1)}{2!} \Delta^2 y_0 + \frac{u(u-1)(u-2)}{3!} \Delta^3 y_0 + \dots + \frac{u(u-1)(u-2)\dots(u-n+1)}{n!} \Delta^n y_0$$

where,

$$u = \frac{x-x_0}{h}$$

The polynomial is formed incrementally, making the method computationally efficient for forward-biased data. However, as the interpolation point moves away from the beginning of the data set, the accuracy of this method decreases.