Newton's Backward Interpolation Method

Theory:

Newton's Backward Interpolation Method is similar in structure to the forward method but is applied when the value to be interpolated lies near the end of the data set. It uses backward differences instead of forward differences to construct the interpolation polynomial.

The backward interpolation formula is,

$$y = y_n + v\nabla y_n + \frac{v(v+1)}{2!}\nabla^2 y_n + \frac{v(v+1)(v+2)}{3!}\nabla^3 y_n + \ldots + \frac{v(v+1)(v+2)\ldots(v+n-1)}{n!}\nabla^n y_n$$

Where,

$$v = \frac{x - x_n}{h}$$

When comparing forward and backward interpolation, both methods require equally spaced data and differ mainly in their region of effectiveness within the data table. The choice between them depends entirely on the location of the interpolation point.