Paper Title:

Newton's forward interpolation: representation of numerical data by a polynomial curve

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What it is:

Interpolation is a simple mathematical method which is used to estimate an unknown value or potential yield of a security or asset by using related known values. Interpolation is achieved by using other established values that are located in sequence with the unknown value.

Newton's forward difference formula is a finite difference identity giving an interpolated value between tabulated points in terms of the first value and the powers of the forward difference. When the interpolating point lies closer to the beginning of the interval then the Newton's forward formula is used.

Why needed:

Newton's forward and backward interpolation aka Newton Gregory technique are only available for equal intervals. Let's say you have some data with equal interval and you want to find any missing value in these. Then the formula is used.

How it works:

Use the Newton-Gregory forward interpolation formula to estimate $f(2.5)$ from the following data:

x 2 3 4 5 6

f(x) 1 2 6 24 120

Solution: Form the forward difference table:

x	y=f(x)	Δy	$\Delta_2 y$	$\Delta_3 y$	$\Delta_4 y$
2	1				
		1			
3	2		3		
		4		11	
4	6		14		53
		18		64	
5	24		78		
				96	
6	120				

With x = 2.5, xo= 2, h = 1 then k = 0.5 and we obtain f(2.5) ≅ 1 + 0.5 - 0.375 + 0.6875 - 2.0703 = -0.2578.

Limitations:

- The intervals always needs to be equal.
- Only works on the beginning point values.
- Not precise.
- Works best on limited data

FutureWork: