Poisson eq muh UNIFORM $t(x)$

$$\varphi(x) = \frac{t}{2}x^2 + \left(\frac{\varphi_b - \varphi_a - \frac{t}{2}L^2}{L}\right)x + \varphi_a \rightarrow \varphi(x) = Kx^2 + hx + c$$

$$\Downarrow$$

PARABOLA (Polynomial function second-order)

○ For every node

$\underbrace{2^{nd} \text{ order}}_{\text{accuracy}}$ Fite Difference Formula $\Rightarrow$ <u>NO TRUNCATION ERROR</u> (1)

$$\left.\frac{d^2\varphi}{dx^2}\right|_k = \frac{\varphi_{k+1} - 2\varphi_k + \varphi_{k-1}}{\Delta x^2} + O(\Delta x^2) \rightarrow \text{EXACT for Polynomials of order up to 2}$$

Note: roundoff error is still present (2)

when $\Delta x \downarrow$ φ_{k+1} is "closer" to $\varphi_k \rightarrow$ Numerical cancellation