

E(x+p) = t(x) + pt,(x) + pz t,(Q)

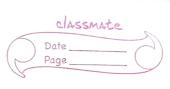
when G E [x, x+h]

 $|S^{+}(x) - f'(x)| = \frac{1}{2} S''(G)$ 

He case where so is large, then he has to be small enough for good approximation.

Centred finite diff For small hoo, 8 (x) = f(x+h) - f(x-h) assuming & is this differentiable f(x+h)= f(x) + h f'(x) + h 2 f"(G) =0 f(x-h) = f(x) - h'd(x) - h2 f"(g,) -2 2(x+h) - f(x-h) = 2hf'(x) + h2 (f''(s))-f''(co))  $\frac{f(x+h)-f(x-h)}{2h} = f'(x) + \frac{h}{4} \left( f''(G_i) - f''(G_i) \right)$ 

 $\Rightarrow \left| S_{h}^{c}(x) - f'(x) \right| = \frac{h}{h} \left( \left| f''(G_{1}) - f''(G_{2}) \right| \right)$ 



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Divide (ab) into m intervals of equal length. Let

24 = a+km for k \in \{0,1\limin\} \lambda \ta=(5-a)}

In(2) = 5-a \(\frac{1}{2}\) \(\frac{1}2\) \(\frac{1}2\) \(\frac{1}2\) \(\frac{1}2\) \(\frac{1}2\) \(\frac{1}2\

For twice differentiable f(x) on the interval [a,b] we have  $E^{T}(t):=\int_{a}^{b}f(x)dx-T_{1}(t)=-h^{2}(b-a)$   $f''(C_{1})$ 

Ever for one sub-interval:

= [ (a) + t,(a) ( 5-a) + t,(c) (x x) ] ys - p ((a) + (a) + p ((a) + p ((a)

E= -43 6"(B)

 $\Sigma(\xi) = \int_{S} t(x) dx$ ;  $L^{\nu}(\xi) = \sum_{z=0}^{\infty} \sum_{z=0}^{\infty} (f(z) + f(x))$ 

Confing. with above result,  $E_{1}^{T}(f) = -h^{3} f''(v_{1}) + ... + -h^{3} f''(v_{n})$ 13.

 $= \frac{15}{-p3^{10}} \left\{ t_{11}(x_1) + \cdots + t_{11}(x_{10}) \right\} cv$ 

 $E_n(p) = -h^2(b-a) f''(\phi_n)$  where  $\phi_n \in (a,b)$