

Deriva

Derivation for Maclaurin series

If the expansion is around  $x=0$ ;

$$f(x) = f(0) + f'(0) \cdot x + \frac{f''(0) \cdot x^2}{2!} + \frac{f^{(3)}(0) \cdot x^3}{3!} + \dots$$

$$f(x) = \cos x$$

$$f(x+h) = f(x) + f'(x) \cdot h + \frac{f''(x) \cdot h^2}{2!} + \frac{f^{(3)}(x) \cdot h^3}{3!}$$

$$x=0;$$

$$f(h) = \cos 0 - \sin 0 \cdot h - \frac{\cos 0 \cdot h^2}{2!} + \frac{\sin 0 \cdot h^3}{3!}$$

$$= 1 - \frac{h^2}{2!} + \frac{h^4}{4!} - \frac{h^6}{6!} + \frac{h^8}{8!} + \dots$$

 $\cos h$ 

$$\cos x = 0$$

$$1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$