

$$f(x+2h) = f(x) + (2h)f'(x) + \frac{1}{2}(2h)^2 f''(x) + \frac{1}{6}(2h)^3 f'''(x) + \frac{1}{24}(2h)^4 f^{(4)}(x)$$

$$f(x-2h) = f(x) + (-2h)f'(x) + \frac{1}{2}(-2h)^2 f''(x) + \frac{1}{6}(-2h)^3 f'''(x) + \frac{1}{24}(-2h)^4 f^{(4)}(x)$$

$$4f(x+h) = 4f(x) + 4f'(x)h + \frac{4}{2}h^2 f''(x) + \frac{4}{6}h^3 f'''(x) + \frac{4}{24}h^4 f^{(4)}(x)$$

$$4f(x-h) = 4f(x) - 4f'(x)h + \frac{4}{2}h^2 f''(x) - \frac{4}{6}h^3 f'''(x) + \frac{4}{24}h^4 f^{(4)}(x)$$

haciendo

$$f(x+2h) + f(x-2h) - 4f(x+h) - 4f(x-h)$$

obtenemos haciendo partición

$$D^4 f(x_j) \approx \left(f(x_j+2) - 4f(x_j+1) + 6f(x_j) - 4f(x_j-1) + f(x_j-2) \right) / h^4$$