Problemas parcial 1

Derivación:

5. $f(x_j+2) \approx f(x_j) + 2hf'(x_j) + \frac{(2h)^2}{2} f''(x_j) + \frac{(2h)^3}{3!} f'''(x_j) + \frac{(2h)^4}{4!} f^4(x_j)$

$f(x_j-2) \approx f(x_j) - 2hf'(x_j) + \frac{(2h)^2}{2} f''(x_j) - \frac{(2h)^3}{3!} f'''(x_j) + \frac{(2h)^4}{4!} f^4(x_j)$

(+)

$$f(x_j+2) + f(x_j-2) \approx 2f(x_j) + 4h^2 f''(x_j) + \frac{h^4}{12} f^4(x_j)$$

$$f^4(x_j) \approx \frac{12\left(f(x_j+2) + f(x_j-2) - 2f(x_j) - 4h^2\left(\frac{f(x_j+1) + f(x_j-1) - 2f(x_j)}{h^2}\right)\right)}{h^4}$$

$$f^4(x_j) \approx \frac{12f(x_j+2) - 48f(x_j+1) + 72f(x_j) - 48f(x_j-1) + 12f(x_j-2)}{h^4} \neq \frac{f(x_j+2) - 4f(x_j+1) + 6f(x_j) - 4f(x_j-1) - f(x_j-2)}{h^4}$$