$$\int_0^{3h} (x)(x-h)(x-2h)(x-3h)\,dx$$

$$= \int_0^{3h} x^4 - 6h x^3 + 11h^2 x^2 - 6h^3 x$$

$$= \frac{x^5}{5} - \frac{6h\,x^4}{4} + \frac{11h^2 x^3}{3} - \frac{6h^3 x^2}{2}\Big]_0^{3h}$$

$$= \frac{x^5}{5} - \frac{3}{2} h x^4 + \frac{11}{3} h^2 x^3 - 3h^3 x^2\Big]_0^{3h}$$

$$= \frac{3^5 h^5}{5} - \frac{3}{2} h \cdot (3h)^4 + \frac{11}{3} h^2 \cdot (3h)^3 - \underline{3h^3 (3h)^2}$$

$$= \frac{3^5 h^5}{5} - \frac{3^5 h^5}{2} + \frac{11 \cdot 27}{3} h^5 - 27 h^5$$

$$= \frac{3^5 h^5}{5} - \frac{243}{2} h^5 + \frac{297}{3} h^5 - 27 h^5$$

$3h^5$

$$= \frac{243h^5}{5} - \frac{243h^5}{2} + \frac{297}{3} - 27h^5$$

$$= h^5\left(\frac{243}{5} - \frac{243}{2} + \frac{297}{3} - 27\right)$$

$$= h^5\left(-\frac{9}{10}\right)$$

$$E = \frac{f^{(4)}(\xi)}{4!}\int_0^{3h} x(x-h)(x-2h)(x-3h)\,dx$$

$$= \frac{f^{(4)}(\xi)}{4!}\left(-\frac{9}{10}\right)h^5 = f^{(4)}(\xi) \cdot -\frac{9}{10 \cdot 24}h^5$$

$$= -\frac{3}{80}h^5 f^{(4)}(\xi)$$

Confirmamos que el error siempre será

$$-\frac{3}{80}h^5 f^{(4)}(\xi)$$

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