

Calcular los coeficientes:

$$D_3 f(x) = A f_{i+1} + B f_i + C f_{i-1} + D f_{i-2}$$

$$f_{i-1} = f_i + (-h) f_i' + \frac{(-h)^2}{2!} f_i'' + \frac{(-h)^3}{3!} f_i''' + \frac{(-h)^4}{4!} f_i^{(4)} + O(h^5)$$

$$f_{i-2} = f_i + (-2h) f_i' + \frac{(-2h)^2}{2!} f_i'' + \frac{(-2h)^3}{3!} f_i''' + \frac{(-2h)^4}{4!} f_i^{(4)} + O(h^5)$$

$$f_{i+1} = f_i + (h) f_i' + \frac{(h)^2}{2!} f_i'' + \frac{(h)^3}{3!} f_i''' + \frac{(h)^4}{4!} f_i^{(4)} + O(h^5)$$

$$f_i = A \left(f_i + (h) f_i' + \frac{(h)^2}{2} f_i'' + \frac{h^3}{6} f_i''' + \frac{h^4}{24} f_i^{(4)} + \dots \right) + B f_i + C \left(f_i - h f_i' + \frac{h^2}{2} f_i'' - \frac{h^3}{6} f_i''' + \frac{h^4}{24} f_i^{(4)} + \dots \right) + D \left(f_i - 2h f_i' + \frac{4h^2}{2} f_i'' - \frac{8h^3}{6} f_i''' + \frac{16h^4}{24} f_i^{(4)} + \dots \right)$$

$$f_i = (A+B+C+D) f_i - (-A+C+2D) h f_i' + \left(\frac{1}{2} A + \frac{1}{2} C + 2D \right) h^2 f_i'' - \left(-\frac{1}{6} A + \frac{1}{6} C + \frac{4}{3} D \right) h^3 f_i''' + \left(\frac{1}{24} A + \frac{1}{24} C + \frac{2}{3} D \right) h^4 f_i^{(4)}$$

$$A+B+C+D=0$$