

March 4, 2024

## TAREA — Extrapolación de Richardson

### 1. Extrapolación de Richardson para la Diferenciación Central

$$D_{cd}(h) = \frac{f(x + \frac{h}{2}) - f(x - \frac{h}{2})}{h} + O(h^2) \quad (1-1)$$

Formula para extrapolación de Richardson

$$G = \frac{2^P g(h/2) - g(h)}{2^P - 1} + O(h^{p+q}) \quad (1-2)$$

$$G_{cd} = \frac{2^{(2)} \left[ \frac{f(x + \frac{h/2}{2}) - f(x - \frac{h/2}{2})}{h/2} \right] - \left[ \frac{f(x + \frac{h}{2}) - f(x - \frac{h}{2})}{h} \right]}{2^{(2)} - 1} + O(h^4) \quad (1-3)$$

$$\frac{4(2)}{3} \left[ \frac{f(x + \frac{h}{4}) - f(x - \frac{h}{4})}{h} \right] - \frac{1}{3} \left[ \frac{f(x + \frac{h}{2}) - f(x - \frac{h}{2})}{h} \right] + O(h^4) \quad (1-4)$$

$$\frac{8f(x + \frac{h}{4}) - 8f(x - \frac{h}{4}) - f(x + \frac{h}{2}) + f(x - \frac{h}{2})}{3h} + O(h^4) \quad (1-5)$$

$$H = \frac{h}{4}, h = 4H \quad (1-6)$$

$$\frac{8f(x + \frac{4H}{4}) - 8f(x - \frac{4H}{4}) - f(x + \frac{4H}{2}) + f(x - \frac{4H}{2})}{3(4H)} + O(h^4) \quad (1-7)$$

$$\frac{8f(x + H) - 8f(x - H) - f(x + 2H) + f(x - 2H)}{12H} + O(H^4) \quad (1-8)$$

Submitted by Gómez Bustamante Norma Gabriela on 4 de marzo de 2024.