Método Newton-Raphson

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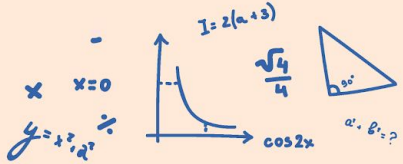

FÓRMULA

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

XO

ALGORITMO

```
Sea x un estimado de la raíz
de f(x) = 0

Iterar hasta |Δx| < ε
    Calcular Δx = -f(x)/f'(x)
    x      x +Δx
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CONDICIONES DE CONVERGENCIA

Existe **a** y **b** tal que $f(a) * f(b) > 0$

$f''(x)$

No cambia de signo en [a, b]

Las tangentes a **f(x)** en a y b cortan al eje de abscisas en [a, b]

CONDICIONES PARA APLICAR

- La función debe ser derivables y continuas
- Proporcionar un valor x inicial

RESULTADOS

Valores de las raíces

0.51493326466112941380
10592584369123175782

1.11415714087193008730
05251781692039039 56

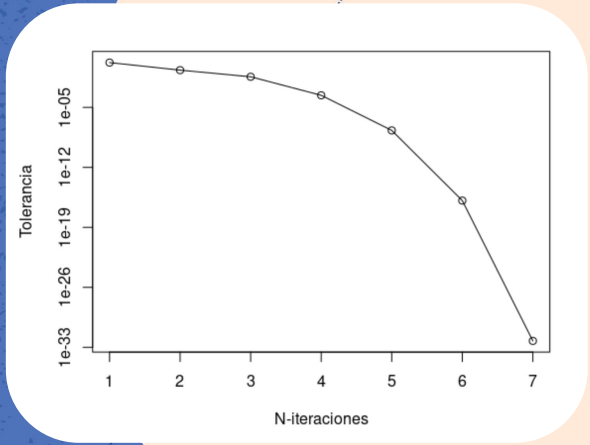
0.66666987095209829807
33018212248904119862

	$f(x) = \cos^2(2x) - x^2$	$f(x) = x\sin(x) - 1$	$f(x) = x^3 2x^2 + \frac{4}{3}x - \frac{8}{27}$
$\varepsilon = 10^{-8}$	5	3	31
$\varepsilon = 10^{-16}$	6	4	34
$\varepsilon = 10^{-32}$	7	5	35

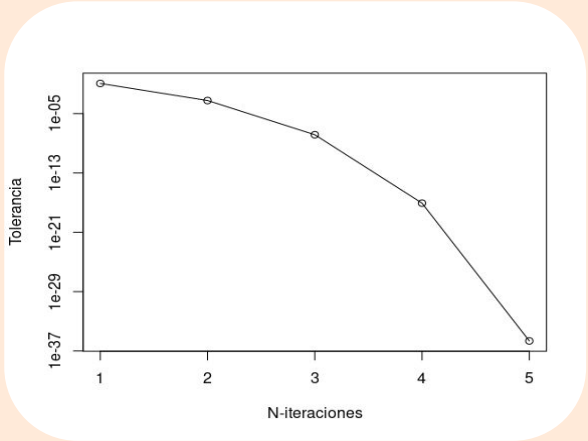
GRÁFICAS TOLERANCIA – NÚMERO DE ITERACIONES

$$\varepsilon = 10^{-32}$$

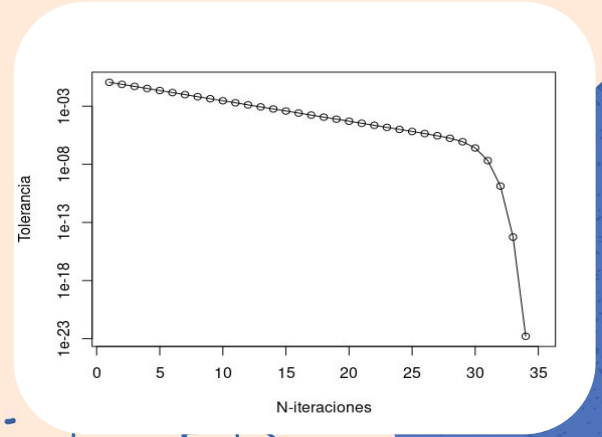
$$f(x) = \cos^2(2x) - x^2$$

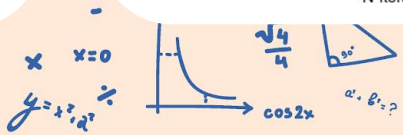


$$f(x) = x\sin(x) - 1$$



$$f(x) = x^3 2x^2 + \frac{4}{3}x - \frac{8}{27}$$





COMPARACIÓN CONTRA BISECCIÓN