S • T • Q • Q • S • S • D

① $f(x) = x^2 - x - 2.5$

A partir do grafico podemos obter as raizes A e B com $A(-1{,}5, -1)$ e $B(2, 2{,}5)$

Obtendo o zero da função

$$x^2 = x - 2{,}5$$
$$x^2 = x + 2{,}5$$
$$x = \sqrt{x+2{,}5}$$

$$L'(x) = \frac{1}{2{,}5\sqrt{x+2{,}5}}$$

$$L'(x) = \frac{1}{2{,}5\sqrt{x+2{,}5}} < 1 \quad \text{para A e B}$$

$$A = \quad x_0 = \frac{a+b}{2} = \frac{(-1{,}5 + (-1))}{2} = \frac{-2{,}5}{2} = -1{,}25$$

$$x_0 = -1{,}25 = \sqrt{-1{,}25+2{,}5} = 1{,}11803$$

$$x_1 = \sqrt{1{,}11803+2{,}5} = \pm 1{,}90211$$
$$x_2 = \sqrt{1{,}90211+2{,}5} = \pm 2{,}09812$$
$$x_3 = \sqrt{2{,}09812+2{,}5} = \pm 2{,}14432$$
$$x_4 = \pm 2{,}15507$$
$$x_5 = \pm 2{,}15757$$
$$x_6 = \pm 2{,}15819$$
$$x_7 = \pm 2{,}15827$$
$$x_8 = \pm 2{,}15830$$
$$x_9 = \pm 2{,}15831$$
$$x_{10} = 2{,}15831$$

Criterio de Parada

I) $\dfrac{|x_k - x_{k-1}|}{2} < \varepsilon$.

$\dfrac{|2,15831 - 2,15830|}{2} < \varepsilon \Rightarrow 5.10^{-6} < \varepsilon$

$0,000005$

II) $|f(x)| < \varepsilon$

$f(x) = x^2 - x - 2,5$

$f(x) = 2,15831^2 - 2,15831 - 2,5$

$f(x) = -7,9439 . 10^{-6} < \varepsilon$

$f(x) = |7,9439 . 10^{-6}| < \varepsilon$

$B \Rightarrow x_0 = \dfrac{a+b}{2} = \dfrac{(2+2,5)}{2} = 2,25$

$x_0 = 2,25 = \sqrt{2,25 + 4,25}$

$B \Rightarrow x_0 = \dfrac{a+b}{2} = \dfrac{(2+2,5)}{2} = 2,25$

$x_1 = \sqrt{2,25 + 2,5} = 2,17945$

$x_2 = \sqrt{2,17945 + 2,5} = 2,16320$

$x_3 = \sqrt{2,16370 + 2,5} = 2,15945$

$x_4 = \sqrt{2,15945 + 2,5} = 2,15857$

$x_5 = \sqrt{2,15857 + 2,5} = 2,15837$

$x_6 = \sqrt{2,15837 + 2,5} = 2,15833$

$x_7 = \sqrt{2,15833 + 2,5} = 2,15832$

$x_8 = \sqrt{2,15832 + 2,5} = 2,15831$

Criterio de parada

I) $\frac{|2,15831 - 2,15830|}{2} = 5 \cdot 10^{-4} < \varepsilon$

II) $f(x) = x^2 - x - 2,5$

$f(x) = |+7,9939 \cdot 10^{-4}| < \varepsilon$

(5) $f(x) = e^x + 0,5x - 0,5$

Gerando o grafico da $f(x)$ a raiz gerada é de $A[-0,5, 0]$

$f'(x) = e^x + 0,5$

Seja $x_0 = \frac{(a+b)}{2} = \frac{(-0,5+0)}{2} = -0,25$

$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)} = -0,25 - \frac{0,153801}{1,278801}$

$x_1 = -0,37027$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = -0,37027 - \frac{0,005413}{1,190548}$

$x_2 = -0,374817$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -0,374817 - \frac{0,000007}{1,157415}$

$S_L \cdot T_M \cdot O_M \cdot O_J \cdot S_V \cdot S_S \cdot D_D$

$y_3 = -0{,}374823$

$x_4 = x_2 - f(x_3) = -0{,}374823 = \dfrac{0}{1{,}187411}$

$x_4 = -0{,}374823$

critério de Parada $\qquad \varepsilon = 0{,}000005$

I) $\dfrac{(x_k - x_{k-1})}{2} < \varepsilon$

$\dfrac{(-0{,}374823 - (-0{,}374822))}{2} = -0{,}0000005$

$|\pm 0{,}0000005| < \varepsilon \qquad$ OK

II) $|f(x)| < \varepsilon$

$f(x) = e^x + 0{,}5x - 0{,}5$

$f(x) = e^{-0{,}374823} + 0{,}5(-0{,}374823) - 0{,}5$

$f(x) = -0{,}000000056 < \varepsilon$

$|0{,}000000056| < \varepsilon \qquad$ OK