

① $f(x) = x^2 - x - 2,5$

A partir do gráfico podemos obter as raízes A, B com A(-1,5, -1) e B(2, 2,5)

Obtendo o zero da função

$$x^2 = x - 2,5$$

$$x^2 = x + 2,5$$

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

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

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

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

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

$$x_1 = \sqrt{1,11803 + 2,5} = \pm 1,90211$$

$$x_2 = \sqrt{1,90211 + 2,5} = \pm 2,09812$$

$$x_3 = \sqrt{2,09812 + 2,5} = \pm 2,14432$$

$$x_4 = \pm 2,15507$$

$$x_5 = \pm 2,15815$$

$$x_6 = \pm 2,15819$$

$$x_7 = \pm 2,15824$$

$$x_8 = \pm 2,15830$$

$$x_9 = \pm 2,15831$$

$$x_{10} = 2,15831$$

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Criterio de Parada

$$I) \frac{|X_k - X_{k-1}|}{2} < \epsilon$$

$$\frac{|2,15831 - 2,15830|}{2} < \epsilon \Rightarrow 5 \cdot 10^{-6} < \epsilon$$

0,000005

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

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

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

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

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

$$B \Rightarrow X_0 = \frac{a+b}{2} = \frac{(2+2,5)}{2} = 2,25$$

$$X_0 = 2,25 = \sqrt{2,25 + 4,25}$$

$$B \Rightarrow X_0 = \frac{a+b}{2} = \frac{(2+2,5)}{2} = 2,25$$

$$X_1 = \sqrt{2,25 + 2,5} = 2,14945$$

$$X_2 = \sqrt{2,14945 + 2,5} = 2,16320$$

$$X_3 = \sqrt{2,16320 + 2,5} = 2,15945$$

$$X_4 = \sqrt{2,15945 + 2,5} = 2,15857$$

$$X_5 = \sqrt{2,15857 + 2,5} = 2,15834$$

$$X_6 = \sqrt{2,15834 + 2,5} = 2,15833$$

$$X_7 = \sqrt{2,15833 + 2,5} = 2,15832$$

$$X_8 = \sqrt{2,15832 + 2,5} = 2,15831$$

$$s_1 = 1, s_2 = 1, s_3 = 1, s_4 = 1, s_5 = 1, s_6 = 1$$

Critério de parada

$$I) |2,15831 - 2,15830| = 10^{-4} < \epsilon$$

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

$$f(x) = | + 49939 \cdot 10^{-4} | < \epsilon$$

$$⑤ f(x) = e^x + 0,5x - 0,5$$

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

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

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

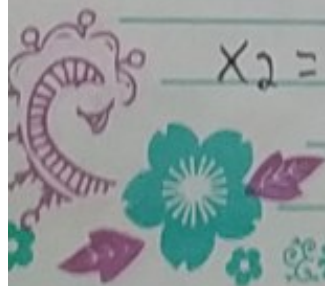
$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)} = -0,25 - \frac{0,153801}{1,218801}$$

$$x_1 = -0,37024$$

$$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = -0,37024 - \frac{0,005413}{1,190548}$$

$$x_2 = -0,374814$$

$$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = -0,374817 - \frac{0,000007}{1,154419}$$



$$S_L \cdot T_M \cdot Q_M \cdot Q_J \cdot S_V \cdot S_S \cdot D_0$$

$$J_3 = -0,544823$$

$$X_4 = X_2 - f(x_3) = -0,344823 = \frac{0}{1,184411}$$

$$X_4 = -0,344823$$

critério de Parvatha

$$\epsilon = 0,0000005$$

$$I) \frac{|X_k - X_{k-1}|}{2} < \epsilon$$

$$\frac{|(-0,344823) - (-0,344822)|}{2} = -0,0000005$$

$$| \pm 0,0000005 | < \epsilon \quad \text{OK}$$

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

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

$$f(x) = e^{-0,344823} + 0,5(-0,344823) - 0,5$$

$$f(x) = -0,00000056 < \epsilon$$

$$|0,00000056| < \epsilon \quad \text{OK}$$