

Método de Muller

$$f(x) = x^3 - x + 1$$

1ª. ITERAÇÃO

$$x_0 = -2$$

$$x_1 = 0$$

$$x_2 = -1$$

$$f(x_0) = x^3 - x + 1$$

$$f(-2) = (-2)^3 - (-2) + 1$$

$$f(-2) = -5$$

$$f(x_1) = x^3 - x + 1$$

$$f(0) = (0)^3 - 0 + 1$$

$$f(0) = 1$$

$$f(x_2) = x^3 - x + 1$$

$$f(-1) = (-1)^3 - (-1) + 1$$

$$f(-1) = 1$$

$$h_0 = x_1 - x_0$$

$$h_0 = 0 - (-2)$$

$$h_0 = 2$$

$$h_1 = x_2 - x_1$$

$$h_1 = -1 - 0$$

$$h_1 = -1$$

$$d_0 = \frac{f(x_1) - f(x_0)}{h_0}$$

$$d_0 = \frac{1 - (-5)}{2}$$

$$d_0 = 3$$

$$d_1 = \frac{f(x_2) - f(x_1)}{h_1}$$

$$d_1 = \frac{1 - 1}{-1}$$

$$d_1 = 0$$

$$a = \frac{(d_1 - d_0)}{(h_1 + h_0)}$$

$$a = \frac{(0 - 3)}{(-1 + 2)}$$

$$a = -3$$

$$b = a \times h_1 + d_1$$

$$b = (-3) \times (-1) + 0$$

$$b = 3$$

$$c = f(x_2)$$

$$c = 1$$

$$\Delta = b^2 - 4ac$$

$$\Delta = 21$$

$$x_3 = x_2 + \frac{-2c}{b \pm \sqrt{\Delta}}$$

$$x_{31} = x_2 + \frac{-2c}{b + \sqrt{\Delta}}$$

$$x_{31} = (-1) + \frac{-2(1)}{3 + \sqrt{21}}$$

$$x_{31} = -1,264$$

~~$$x_{32} = x_2 + \frac{-2c}{b - \sqrt{\Delta}}$$~~

~~$$x_{32} = (-1) + \frac{-2(1)}{3 - \sqrt{21}}$$~~

~~$$x_{32} = 0,264$$~~

b positivo portanto

faça $x_3 = x_{31}$

Método de Muller

$$f(x) = x^3 - x + 1$$

$$x_0 = 0 \text{ antigo } x_1$$

$$x_1 = -1 \text{ antigo } x_2$$

$$x_2 = -1,264 \text{ } x_3$$

2ª ITERAÇÃO

$$f(x_0) = x^3 - x + 1$$

$$f(0) = 0^3 - 0 + 1$$

$$f(0) = 1$$

$$f(x_1) = x^3 - x + 1$$

$$f(-1) = (-1)^3 - (-1) + 1$$

$$f(-1) = 1$$

$$f(x_2) = x^3 - x + 1$$

$$f(-1,264) = (-1,264)^3 - (-1,264) + 1$$

$$f(-1,264) = 0,245$$

$$h_0 = x_1 - x_0$$

$$h_0 = -1 - 0$$

$$h_0 = -1$$

$$h_1 = x_2 - x_1$$

$$h_1 = (-1,264) - (-1)$$

$$h_1 = -0,264$$

$$d_0 = \frac{f(x_1) - f(x_0)}{h_0}$$

$$d_0 = \frac{1 - 1}{-1}$$

$$d_0 = 0$$

$$d_1 = \frac{f(x_2) - f(x_1)}{h_1}$$

$$d_1 = \frac{0,245 - 1}{-0,264}$$

$$d_1 = 2,861$$

$$a = \frac{(d_1 - d_0)}{(h_1 + h_0)}$$

$$a = \frac{2,861 - 0}{(-0,264) + (-1)}$$

$$a = -2,264$$

$$b = a \times h_1 + d_1$$

$$b = -2,264 \times (-0,264) + 2,861$$

$$b = 3,458$$

$$c = f(x_2)$$

$$c = 0,245$$

$$\Delta = b^2 - 4ac$$

$$\Delta = (3,458)^2 - 4(-2,264)(0,245)$$

$$\Delta = 14,176$$

$$x_3 = x_2 + \frac{-2c}{b \pm \sqrt{\Delta}}$$

$$x_{31} = -1,264 + \frac{-2(0,245)}{3,458 + \sqrt{14,176}}$$

$$x_{31} = -1,332$$

~~$$x_{32} = -1,264 + \frac{-2(0,245)}{3,458 - \sqrt{14,176}}$$~~

~~$$x_{32} = 0,332$$~~

Métodos de Muller

$$f(x) = x^3 - x + 1$$

$$x_0 = -1 \text{ antigo } x_1$$

3ª ITERAÇÃO

$$x_1 = -1,264 \text{ antigo } x_2$$

$$x_2 = -1,332 \text{ } x_3$$

$$f(x_0) = x^3 - x + 1$$

$$f(-1) = (-1)^3 - (-1) + 1$$

$$f(-1) = 1$$

$$f(x_1) = x^3 - x + 1$$

$$f(-1,264) = (-1,264)^3 - (-1,264) + 1$$

$$f(-1,264) = 0,245$$

$$f(x_2) = x^3 - x + 1$$

$$f(-1,332) = (-1,332)^3 - (-1,332) + 1$$

$$f(-1,332) = -0,030$$

$$h_0 = x_1 - x_0$$

$$h_0 = -1,264 - (-1)$$

$$h_0 = -0,264$$

$$h_1 = x_2 - x_1$$

$$h_1 = -1,332 - (-1,264)$$

$$h_1 = -0,068$$

$$d_0 = \frac{f(x_1) - f(x_0)}{h_0}$$

$$d_0 = \frac{0,245 - 1}{-0,264}$$

$$d_0 = 2,861$$

$$d_1 = \frac{f(x_2) - f(x_1)}{h_1}$$

$$d_1 = \frac{-0,030 - 0,245}{-0,068}$$

$$d_1 = 4,054$$

$$a = \frac{d_1 - d_0}{h_1 - h_0}$$

$$a = \frac{4,054 - 2,861}{-0,068 - (-0,264)}$$

$$a = -3,595$$

$$b = a \times h_1 + d_1$$

$$b = (-3,595) \times (-0,068) + 4,054$$

$$b = 4,298$$

$$c = f(x_2)$$

$$c = -0,030$$

$$\Delta = b^2 - 4ac$$

$$\Delta = (4,298)^2 - 4(-3,595) \cdot (-0,030)$$

$$\Delta = 18,041$$

$$x_3 = x_2 + \frac{-2c}{b \pm \sqrt{\Delta}}$$

$$x_{31} = -1,332 + \frac{-2(-0,030)}{4,298 + \sqrt{18,041}}$$

$$x_{31} = -1,325$$

$$x_{32} = -1,332 + \frac{-2(-0,030)}{4,298 - \sqrt{18,041}}$$

$$x_{32} = -0,143$$