

X的平方根

<https://github.com/sangjianshun/Master-School/blob/master/mySqrt.py>



问题描述

3



1.732

X的平方根



牛顿迭代法

$$\sqrt{3} = x$$



$$3 = x^2$$



$$f(x) = x^2 - 3 = 0$$



$$f(x) - f(x_0) = 2x_0(x - x_0)$$

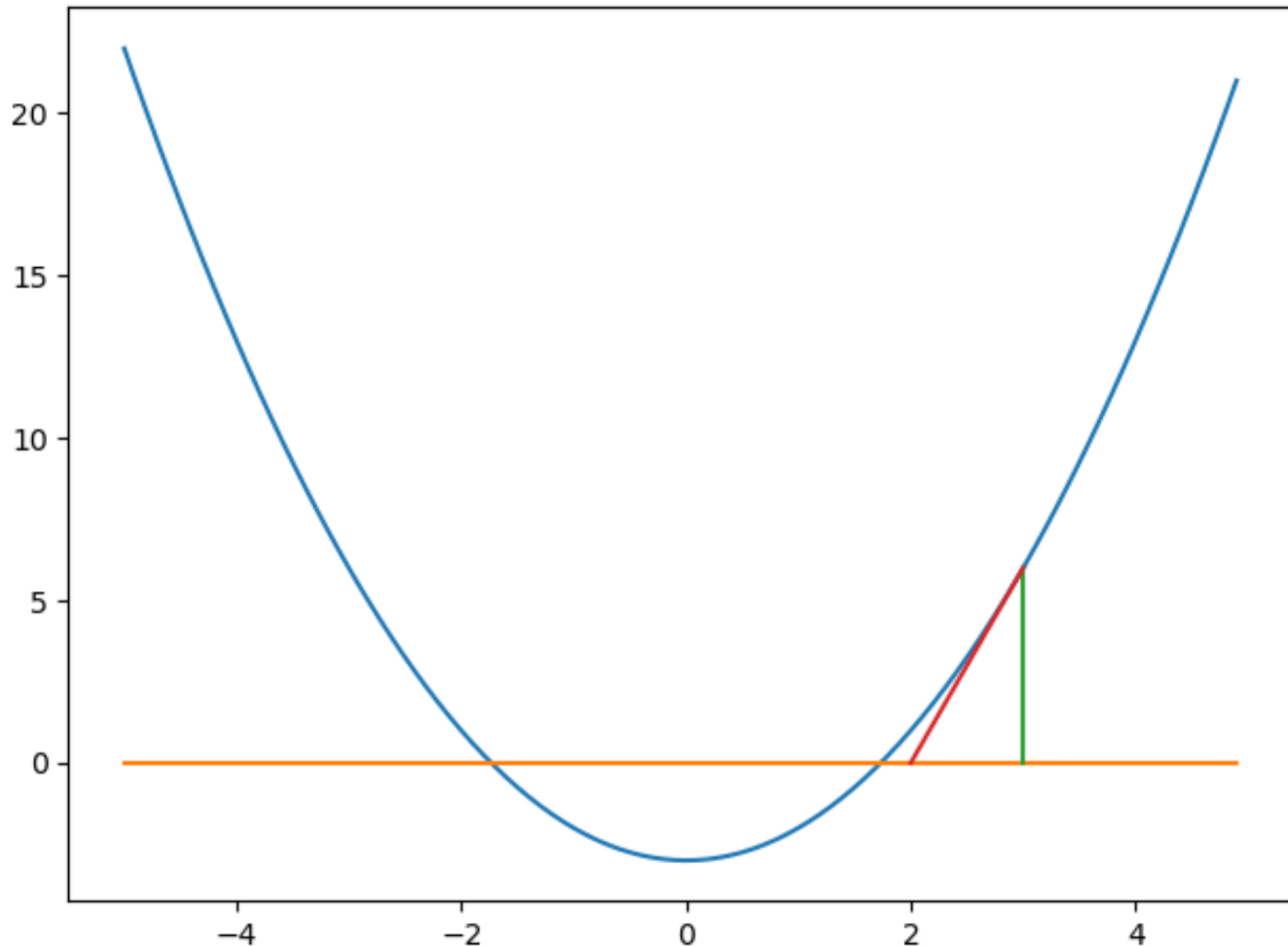
$$\text{令 } x_0 = 3$$

$$f(x) - 6 = 2 \times 3 \times (x - 3)$$



$$\text{令 } f(x) = 0$$

$$x = 2$$



x的平方根



牛顿迭代法

$$\sqrt{n} = x$$

$$n = x^2$$

$$f(x) = x^2 - n = 0$$

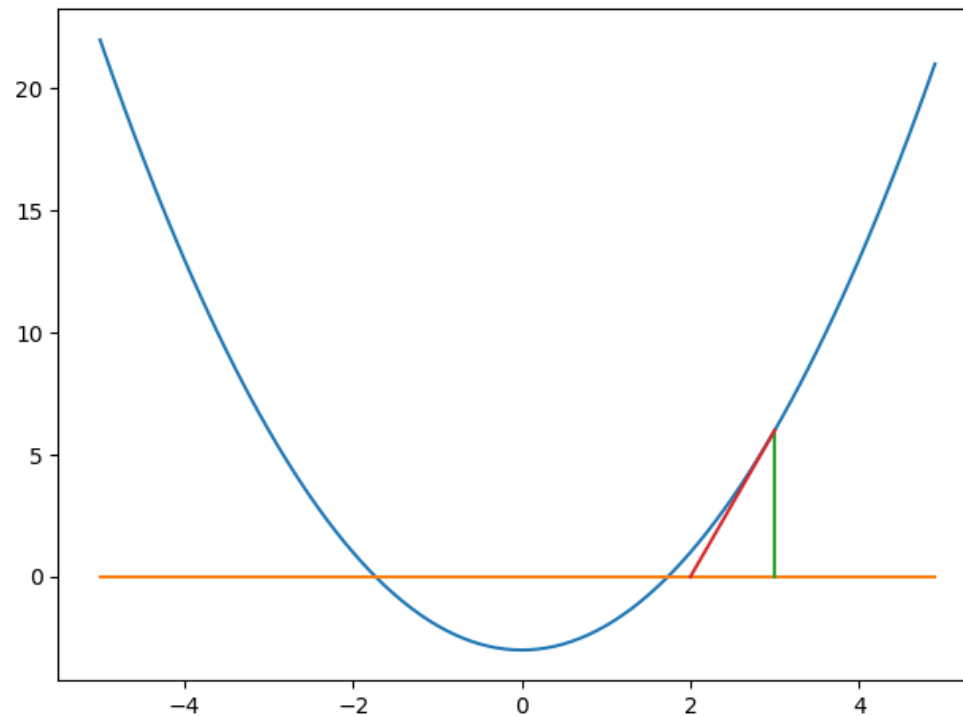
$$\text{令 } x_0 = n$$

$$f(x) - f(x_0) = 2x_0(x - x_0)$$

$$\text{令 } f(x) = 0$$

$$x = \frac{2x_0^2 - f(x_0)}{2x_0}$$

$$x = \frac{x_0}{2} + \frac{n}{2x_0}$$



```
def sqrt(number, r=0.001):  
    x0 = number  
    x1 = x0/2 + number/(2*x0)  
    while abs(x1-x0) > r:  
        x0 = x1  
        x1 = x0/2 + number/(2*x0)  
    return x1
```