X的平方根

● 问题描述

3 ➡ 1.732

X的平方根

牛顿迭代法

$$\sqrt{3} = x$$

$$3 = x^2$$

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

$$f(x) - f(x_0) = 2x_0(x - x_0)$$
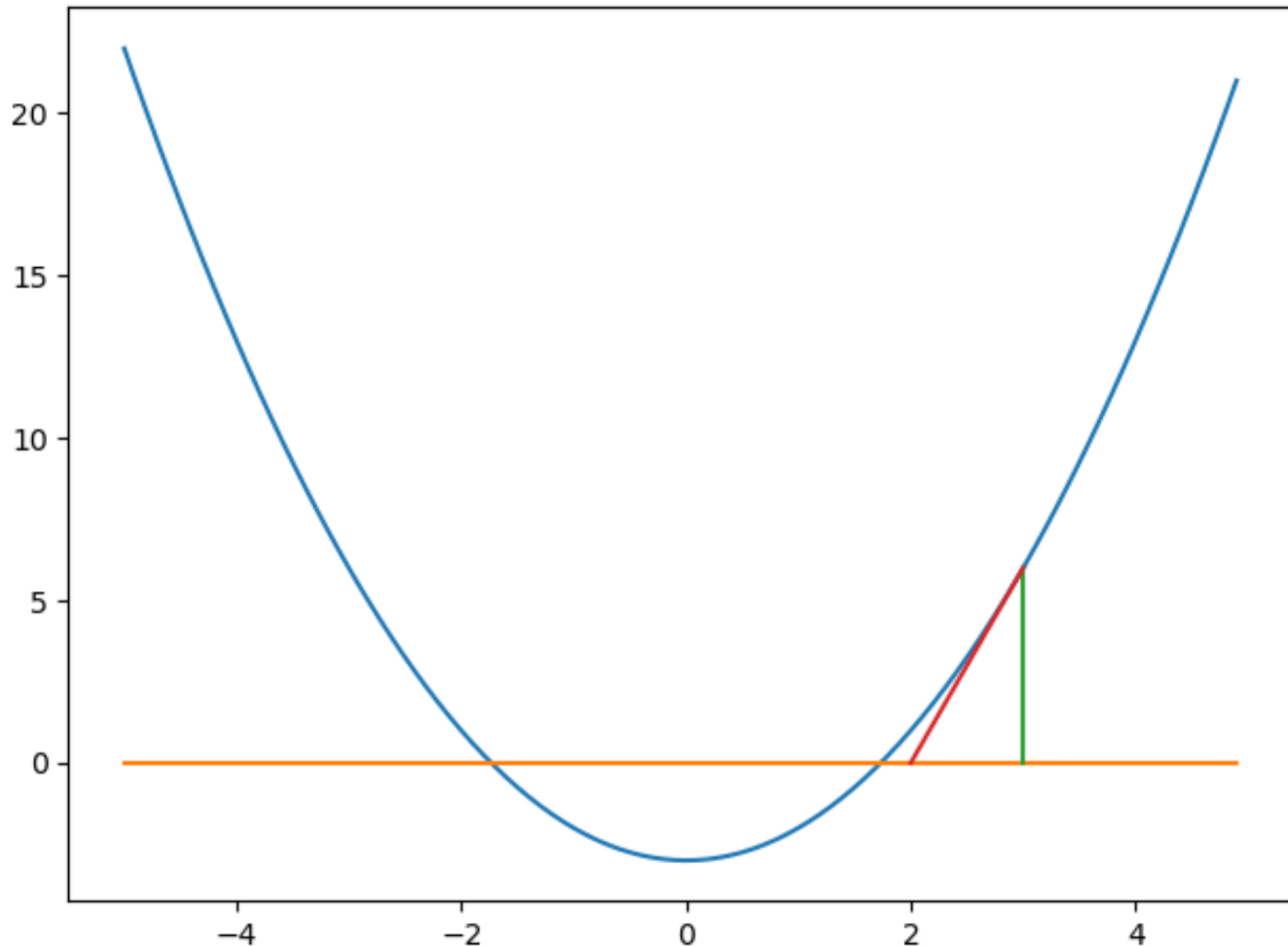$$令 \ x_0 = 3$$
$$f(x) - 6 = 2 \times 3 \times (x - 3)$$

$$令 f(x) = 0$$
$$x = 2$$

X的平方根

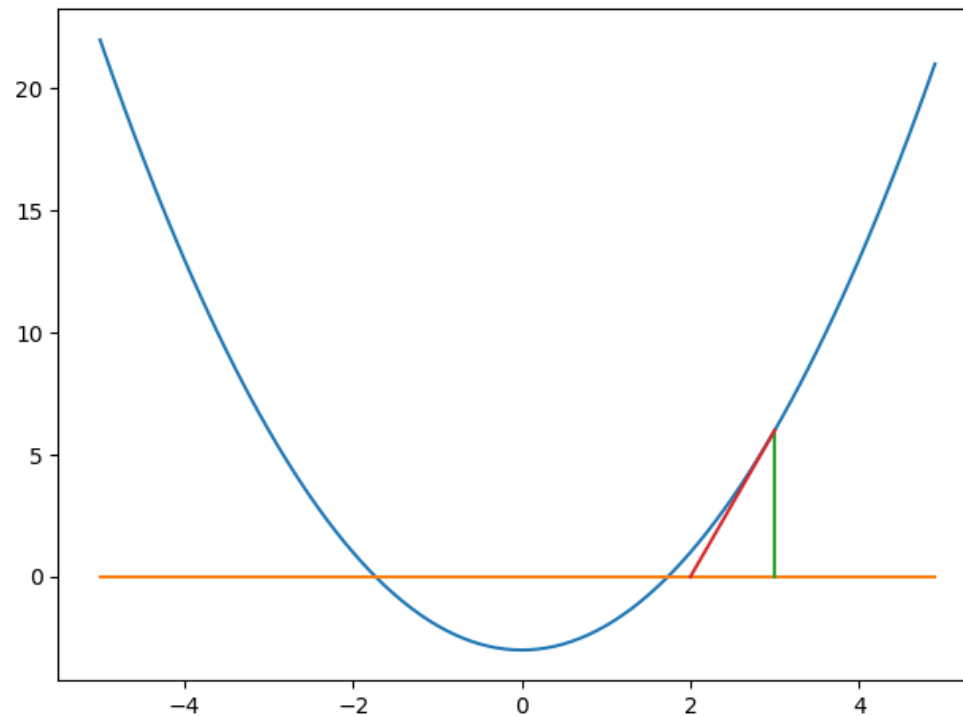● 牛顿迭代法

$$\sqrt{n} = x$$

$$n = x^2$$

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

令 $x_0 = n$

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

令 $f(x) = 0$

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

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

```python
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
```