

Untitled

February 1, 2025

```
[9]: def newton(x,b):  
      return 2.0*x - b*x**2
```

```
[34]: def iterate(x,b,N):  
      y = 1.0*x  
      for i in range(N):  
          # print(f"{i} steps y={y}")  
          y = newton(y,b)  
      return y
```

```
[20]: iterate(1.0,.5,10)
```

```
0 steps y=1.0  
1 steps y=1.5  
2 steps y=1.875  
3 steps y=1.9921875  
4 steps y=1.999969482421875  
5 steps y=1.999999995343387  
6 steps y=2.0  
7 steps y=2.0  
8 steps y=2.0  
9 steps y=2.0
```

```
[20]: 2.0
```

```
[15]: def newtonStep(x,b):  
      return 2*x - 1.0*b*x*x  
      def approx(b,x0,num):  
          x = x0*1.0  
          for i in range(num):  
              xnew = newtonStep(x,b*1.0)  
              x = xnew  
          return x
```

```
[32]: approx(12222, 0.00001 ,100)
```

```
[32]: 8.181966944853544e-05
```

```
[35]: iterate(.00001,12222,100)
```

```
[35]: 8.181966944853542e-05
```

$x_1 = x_0 - f(x_0)/f'(x_0) = 2x_0 - 22x_0^{**2}$

```
[27]: x1 = 2*x0 - 22*x0**2
```

```
[28]: x1
```

```
[28]: -0.875
```

```
[30]: x2 = 2*x1 - 22*x1**2
      x2
```

```
[30]: -18.59375
```

```
[31]: 1.0/12222
```

```
[31]: 8.181966944853542e-05
```

import numpy as np

```
[36]: np.linspace(1,10,5)
```

```
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NameError                                Traceback (most recent call last)
Cell In[36], line 1
----> 1 np.linspace(1,10,5)

NameError: name 'np' is not defined
```

```
[ ]:
```