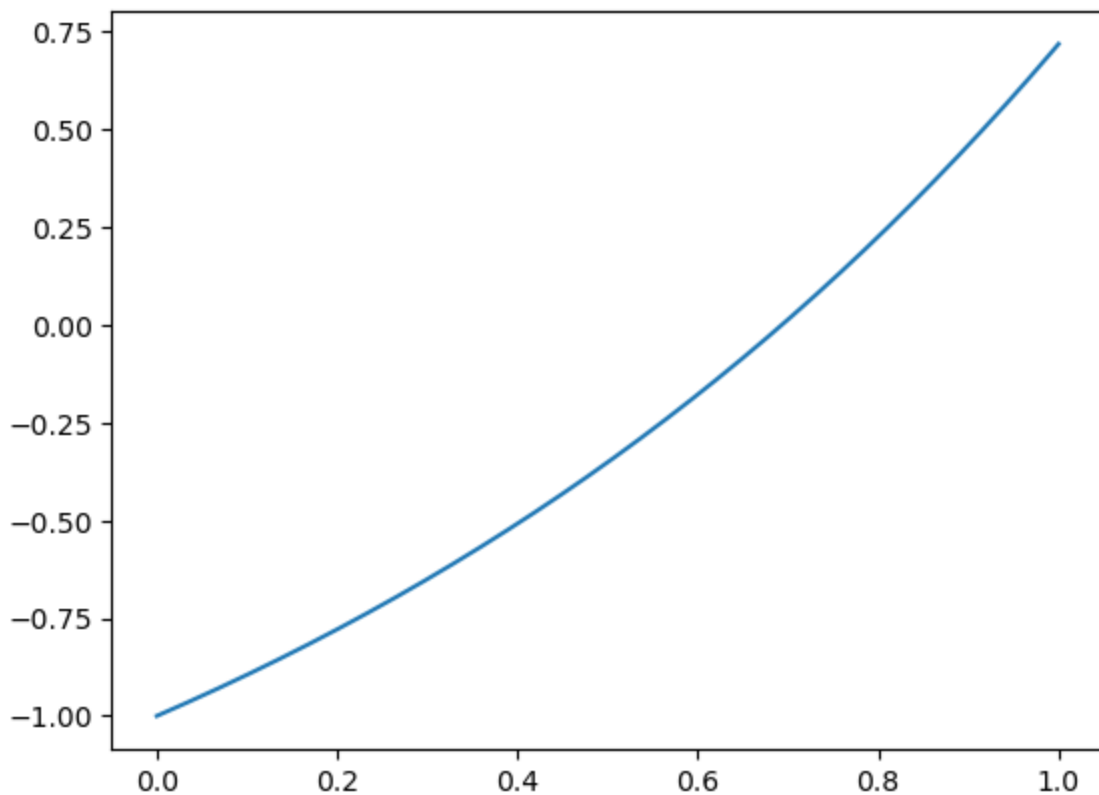


Shooting method

testing nonlinear search of initial values

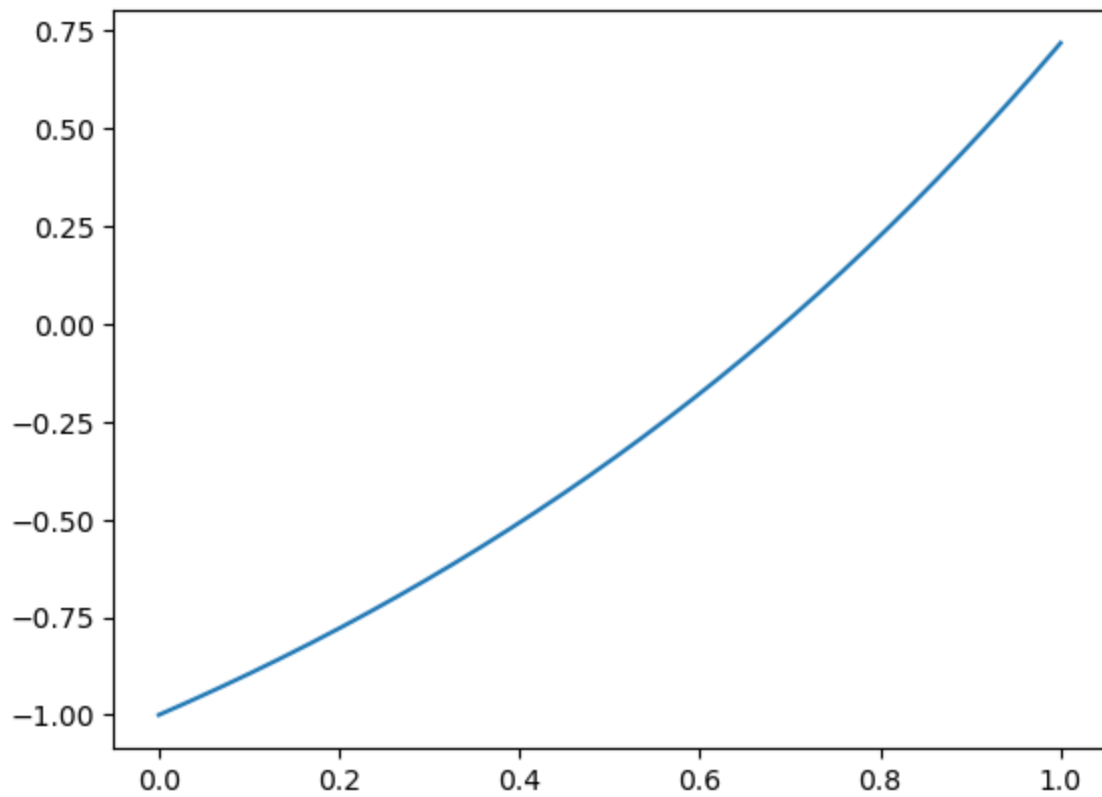
```
In [ ]: import matplotlib.pyplot as plt
import pandas as pd
import numpy as np

res = pd.read_csv('out/shoot.csv')
plt.plot(res['x'], res['y'])
plt.show()
```



testing linear search of initial values

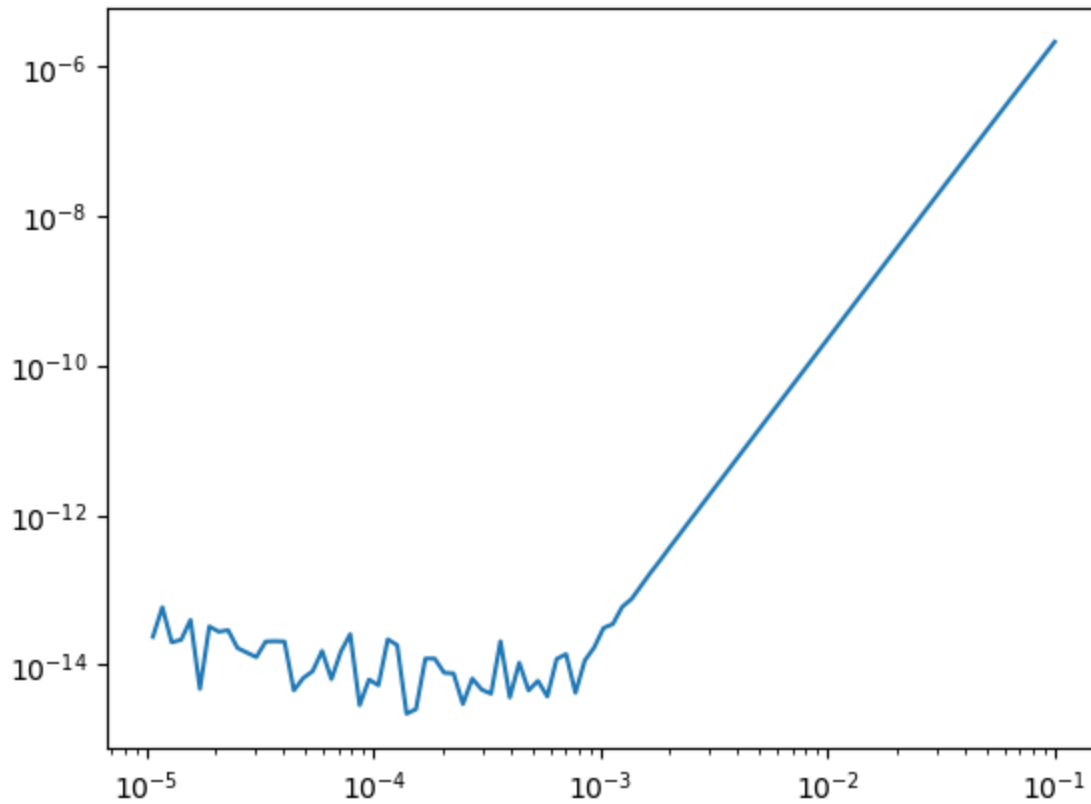
```
In [ ]: res = pd.read_csv('out/shoot_linear.csv')
plt.plot(res['x'], res['y'])
plt.show()
```



Plotting errors depending on step size h

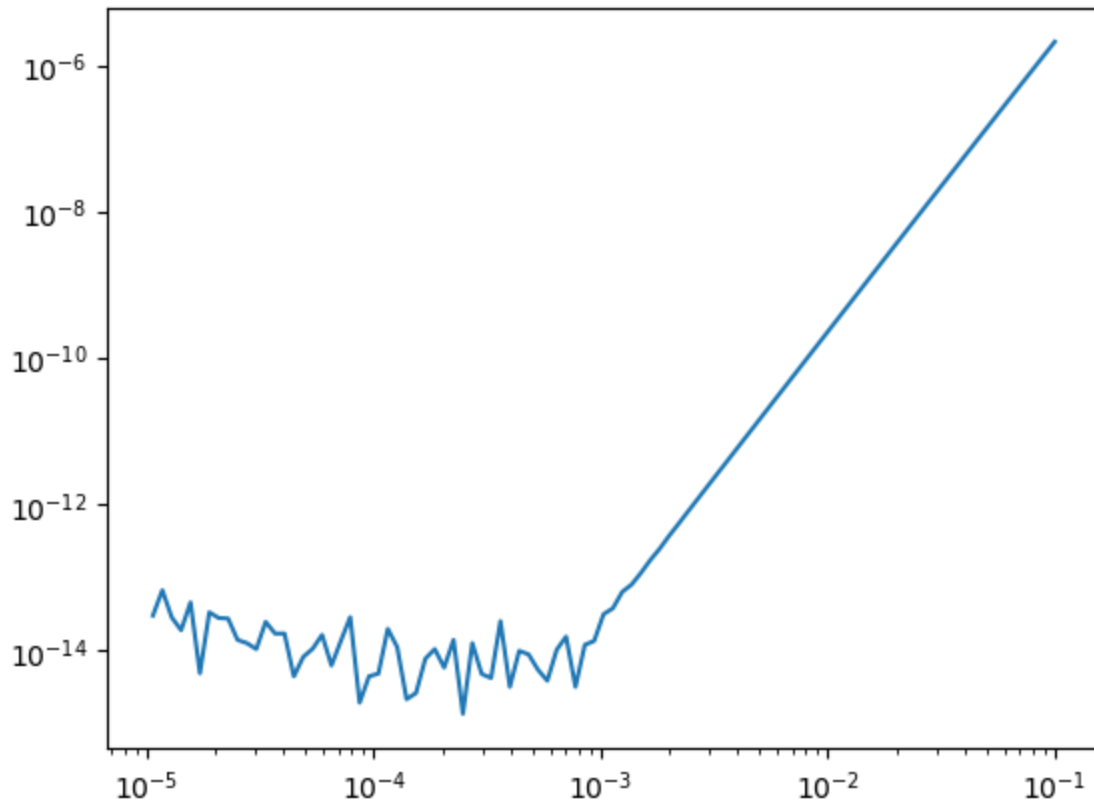
```
In [ ]: res = pd.read_csv('out/shoot_error.csv')
h, err = res['h'], res["error"]
h = h[h > 10e-3]
err = err[0:h.size]
plt.loglog(res['h'], res["error"])
m, b = np.polyfit(np.log(h), np.log(err), 1)
print("Order of convergence: ", m)
plt.show()
```

Order of convergence: 3.959046042111466



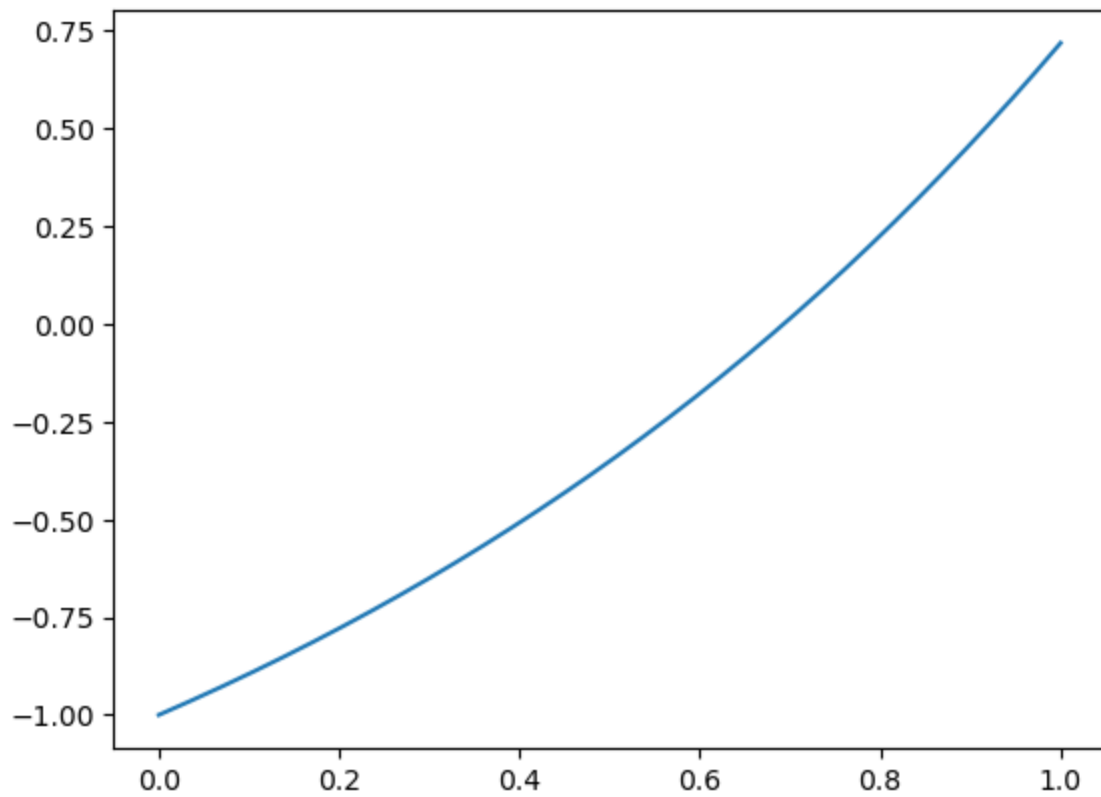
```
In [ ]: res = pd.read_csv('out/shoot_linear_error.csv')
h, err = res['h'], res["error"]
h = h[h > 10e-3]
err = err[0:h.size]
plt.loglog(res['h'], res["error"])
m, b = np.polyfit(np.log(h), np.log(err), 1)
print("Order of convergence: ", m)
plt.show()
```

Order of convergence: 3.9692152799821314



Sweep (Thomas) method

```
In [ ]: res = pd.read_csv('out/thomas.csv')
plt.plot(res['x'], res['y'])
plt.show()
```



Plotting errors depending on step size h

```
In [ ]: res = pd.read_csv('out/thomas_error.csv')
h, err = res['h'], res["error"]
h = h[h > 10e-4]
err = err[0:h.size]
plt.loglog(res['h'], res["error"])
m, b = np.polyfit(np.log(h), np.log(err), 1)
print("Order of convergence: ", m)
plt.show()
```

Order of convergence: 1.9996265218015086

