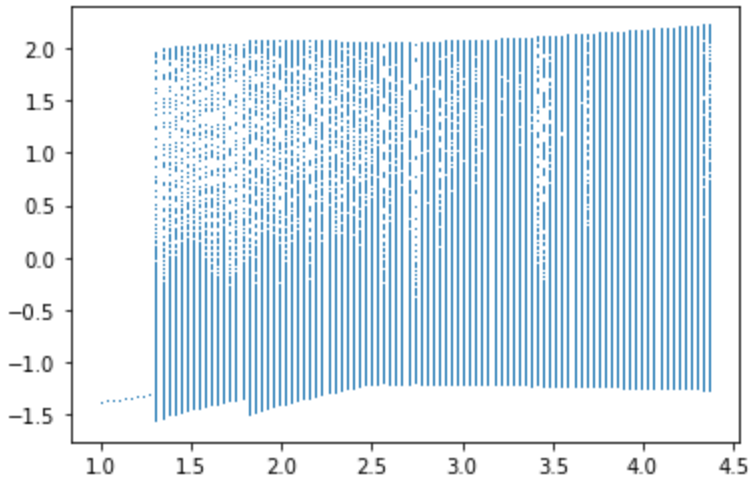
In [ ]:

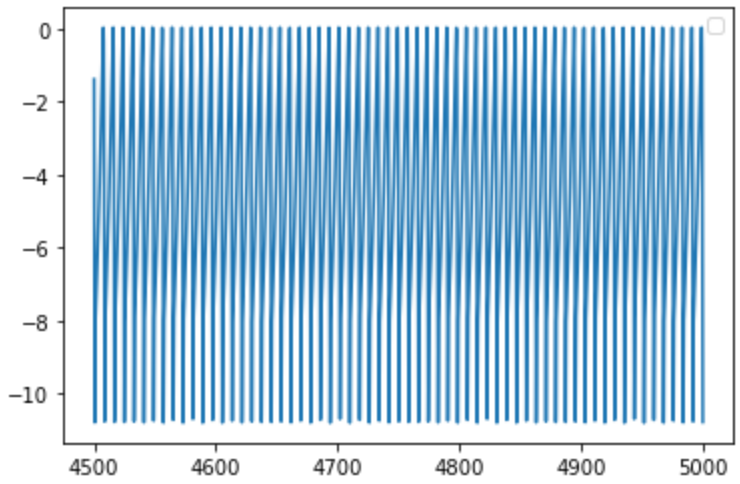
In [12]:
```
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.pyplot as plt
import math
a = 1.0
b = 3.0
c = 1.0
d = 5.0
s = 4.0
alf = - 1.6
r = 0.003
eps = 0.1
x = -0.7797753083855133
y = 0.1963653397308617
z = 0.43101317810390494
x1 = 0
y1 = 0
z1 = 0
ii = []
xx = []
def f1 (funx, funy, funz):
    return funy - a*funx*funx*funx + b*funx*funx - funz + par_i

def f2(funx, funy, funz):
    return c - d*funx*funx - funy

def f3(funx, funy, funz):
    return r*(s*(funx - alf) - funz)

i_min = 1.0
i_max = 4.4
hi = (i_max - i_min)/100
for ia in range(100):
    par_i = i_min + ia*hi
    for j in range(1, 40000):
        x1 = x + eps*f1(x,y,z)
        y1 = y + eps*f2(x,y,z)
        z1 = z + eps*f3(x,y,z)
        x=x1
        y=y1
        z=z1
        if j > 35000:
            ii.append(par_i)
            xx.append(x)
plt.plot(ii, xx, ',')
plt.show()
```



In [4]:
```
ax = plt.figure().add_subplot()
source_list = [(10,13,14),(11,15,16),(12,17,18)]
list1, list2,list3 = zip(*path)
N = 50000
list1
(10,11,12)
list2
(13,14,16)
list3
(15,17,18)
time = [x*h for x in range(N) ]
ax.plot(time[45000:],list2[45000:])
ax.legend()
```

```
No artists with labels found to put in legend.  Note that artists whose label start with an unde
rscore are ignored when legend() is called with no argument.
```

Out[4]:
```
<matplotlib.legend.Legend at 0x1f121869160>
```

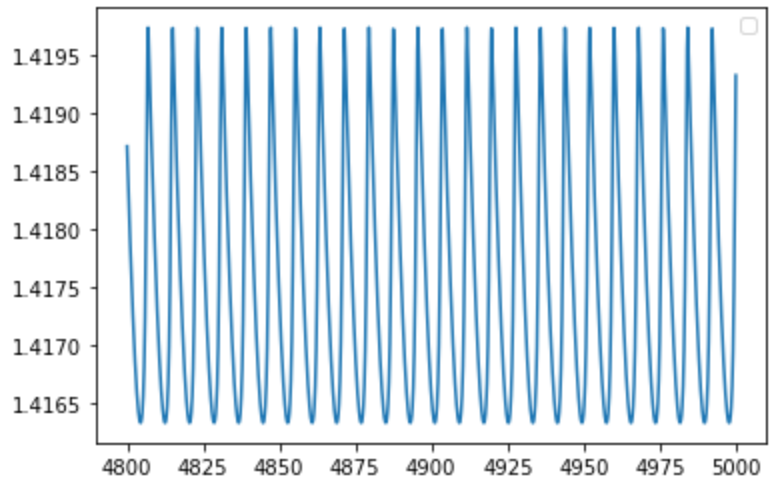


In [5]:
```
ax = plt.figure().add_subplot()
source_list = [(10,13,14),(11,15,16),(12,17,18)]
list1, list2,list3 = zip(*path)
N = 50000
list1
(10,11,12)
list2
(13,14,16)
list3
(15,17,18)
time = [x*h for x in range(N) ]
ax.plot(time[48000:],list3[48000:])
ax.legend()
```

```
No artists with labels found to put in legend.  Note that artists whose label start with an unde
rscore are ignored when legend() is called with no argument.
```

Out[5]:

```
<matplotlib.legend.Legend at 0x1f122d456d0>
```



In [ ]: