Looping_DU

October 28, 2019

1 Looping through all the letters in Down_to_Up direction

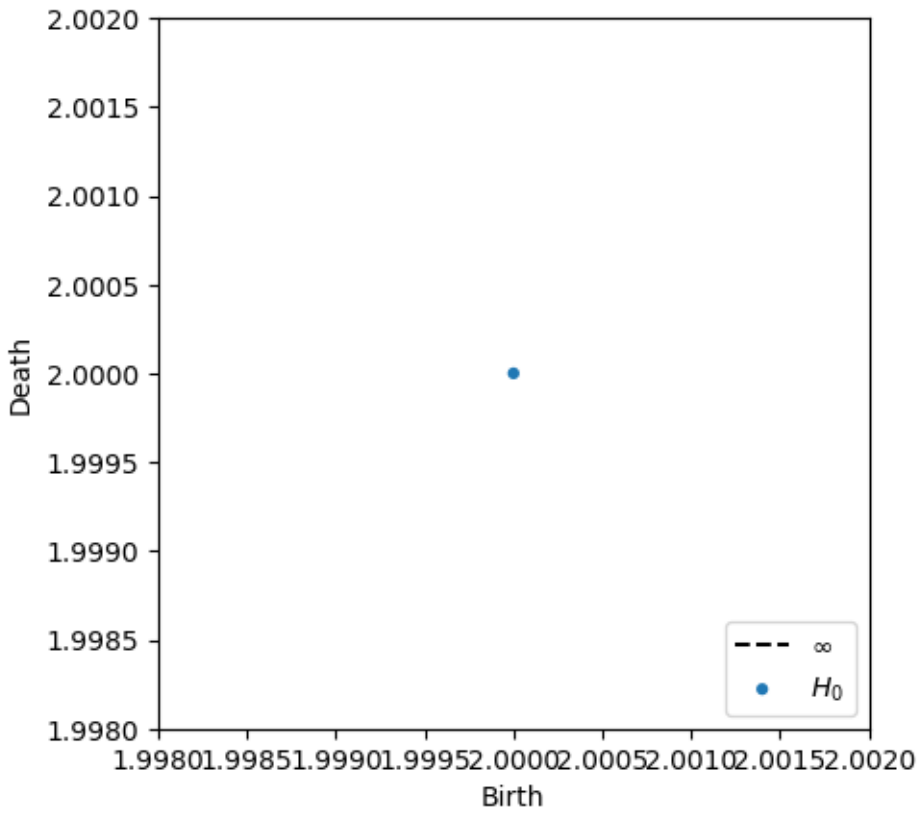
1.1 Importing notebooks

[1]:
```
import numpy as np
import matplotlib.pyplot as plt
import scipy
from scipy import ndimage
import PIL
from persim import plot_diagrams
from ripser import ripser, lower_star_img
import csv
```

[4]:
```
dgmDU = lower_star_img(letter)
print(dgm.shape)
print(dgm)
plot_diagrams(dgm)

plt.show()
```

```
(1, 2)
[[ 2. inf]]
```



[5]:
```
# Down-to-up scanning through loops
letters = genfromtxt('letters.csv', delimiter=',') # Upload the file

dgmDU = [None]*26 #Initialize an empty list
for i in range(26):
    letter_one_line=letters[i,:]

    # initialize matrix of size 10x10 with all values 100
    letter=np.full((10, 10), 100)

    # convert one line letter to 10x10 matrix replacing zeros with 100
    for k in range(1,101):
        if letter_one_line[k]==1.0:
            row=int((k-1)%10)
            column=(k-1)/10
            letter[row,column]=k%10
    dgmDU[i] = lower_star_img(letter)
```

[6]:
```
# Print A-Z diagrams
print(dgmDU[0:25])
```

```
[array([[ 2., inf]]), array([[ 3., inf]]), array([[ 2., inf]]), array([[ 3.,
```

```
inf]]), array([[ 3., inf]]), array([[ 3., inf]]), array([[ 2., inf]]), array([[
3., inf]]), array([[ 4.,  5.],
       [ 4., inf]]), array([[ 4.,  6.],
       [ 4., inf]]), array([[ 3., inf]]), array([[ 3., inf]]), array([[ 2.,
inf]]), array([[ 2., inf]]), array([[ 2., inf]]), array([[ 3., inf]]), array([[
6.,  7.],
       [ 2., inf]]), array([[ 3., inf]]), array([[ 3.,  8.],
       [ 3., inf]]), array([[ 2., inf]]), array([[ 3., inf]]), array([[ 2.,
inf]]), array([[ 2., inf]]), array([[ 3.,  4.],
       [ 3., inf]]), array([[ 3., inf]])]
```

[7]:
```
# Print A diagram
print(dgmDU[0])
```

```
[[ 2. inf]]
```

[8]:
```
# Print Z diagram
print(dgmDU[25])
```

```
[[ 3.  7.]
 [ 2. inf]]
```