

Looping_Angle

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1 Looping through all the letters in angle direction

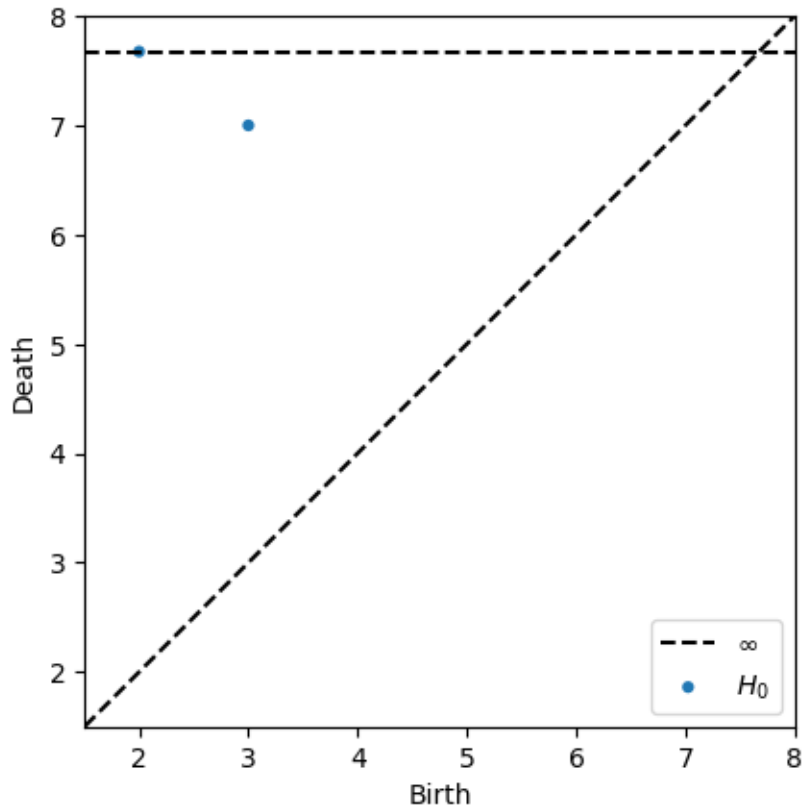
1.1 Importing notebooks

```
[10]: 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
```

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

plt.show()
```

```
(2, 2)
[[ 3.  7.]
 [ 2. inf]]
```



```
[12]: # Probing scanning through loops using maximum values
letters = genfromtxt('letters.csv', delimiter=',') # Upload the file

dgmProb = [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]=max(k%10,int(k-1)%10)
    dgmProb[i] = lower_star_img(letter)

[13]: # Print A-Z diagrams
print(dgmProb[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]])]

```

```

[14]: # Print A digram
print(dgmProb[0])

```

```

[[ 2. inf]]

```

```

[15]: # Print z diagram
print(dgmProb[25])

```

```

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

```