PERSISTENT HOMOLOGY – LAB INSTRUCTIONS

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This information is also available at `http://math.stanford.edu/~mik/kth.html`.

1. Software packages

- `http://comptop.stanford.edu/programs/jplex`
- `http://code.google.com/p/javaplex`
- `http://www.mrzv.org/software/dionysus`

2. Dataset

- The original image data bank is available from van Hateren at `http://www.kyb.mpg.de/bethge/vanhateren/index.php`
- The 4.5M point cloud is available at `http://math.stanford.edu/~tigran/imageset/`
- Two extracted dense subsets exhibiting the barcode behaviour used by Ishkhanov-Carlsson-da Silva-Zomorodian is available at `http://math.stanford.edu/~mik/kth.tar.gz` together with a utility Matlab script used in the example code below.

3. Using jPlex

An excellent tutorial for using jPlex in Matlab is being maintained by Henry Adams at `http://comptop.stanford.edu/programs/jplex/files/PlexMatlabTutorial.pdf`.

Example Matlab code for the analysis of the point cloud data is

```
load nk300c30Dct
points = nk300c30Dct;
pdata = EuclideanArrayData(points);
L = maxminLandmarks(points, 50, 'e');
R = WitnessStream.estimateRmax(pdata, L);
laz = Plex.LazyWitnessStream(0.001, 3, R/4, 1, L, pdata);
intervals = Plex.Persistence.computeIntervals(laz);
Plex.plot(intervals, 'laz', R/4)
plot(points(:,1), points(:,2), '.'), axis equal

load nk15c30Dct
points = nk15c30Dct;
pdata = EuclideanArrayData(points);
L = maxminLandmarks(points, 50, 'e');
R = WitnessStream.estimateRmax(pdata, L);
laz = Plex.LazyWitnessStream(0.001, 3, R/4, 1, L, pdata);
intervals = Plex.Persistence.computeIntervals(laz);
Plex.plot(intervals, 'laz', R/4)
plot(points(:,1), points(:,2), '.'), axis equal
```

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