**DPT**

Immediate

March 27, 2017

**Contents**

Diffusion Pseudo Time (DPT) is a pseudo time metric based on the transition probability of a diffusion process Haghverdi et al. (2016).

*destiny* supports DPT in addition to its primary function of creating *DiffusionMaps* from data.

In [2]: library(destiny)  # load destiny...
   data(guo)             # ... and sample data

DPT is in practice independent of Diffusion Maps:

```
   data
     | transition probabilities
     |                      
     v                     
DiffusionMap  DPT
```

However in order not to overcomplicate things, in *destiny*, you have to create DPT objects from *DiffusionMap* objects. (If you really only need the DPT, skip Diffusion Component creation by specifying `n_eigs = 0`)

In [4]: dm <- DiffusionMap(guo)
   dpt <- DPT(dm)

The resulting object of a call like this will have three automatically chosen tip cells. Plotting without parameters results in the DPT of the first root cell:

In [5]: plot(dpt, pch = 20)  # “pch” for prettier points
Other possibilities include the DPT from the other tips or everything supported by plot.DiffusionMap:

In [7]: par(mfrow = c(1,2), pch = 20, mar = c(2,2,0,1))
    plot(dpt, col_by = 'DPT3')
    plot(dpt, col_by = 'Gata4', pal = viridis::magma)

The DPT object also contains a clustering based on the tip cells and DPT, and you can specify where to draw paths from and to:

In [9]: plot(dpt, root = 2, paths_to = c(1,3), col_by = 'branch', pch = 20)
You can further divide branches. First simply plot branch colors like we did above, then identify the number of the branch you intend to plot, and then specify it in a subsequent plot call. In order to see the new branches best, we specify a dcs argument that visually spreads out out all four branches.

In [10]: plot(dpt, col_by = 'branch', divide = 3, dcs = c(-1,3,-2), pch = 20)
References

Haghverdi, L., M. Büttner, F. A. Wolf, F. Buettner, and F. J. Theis