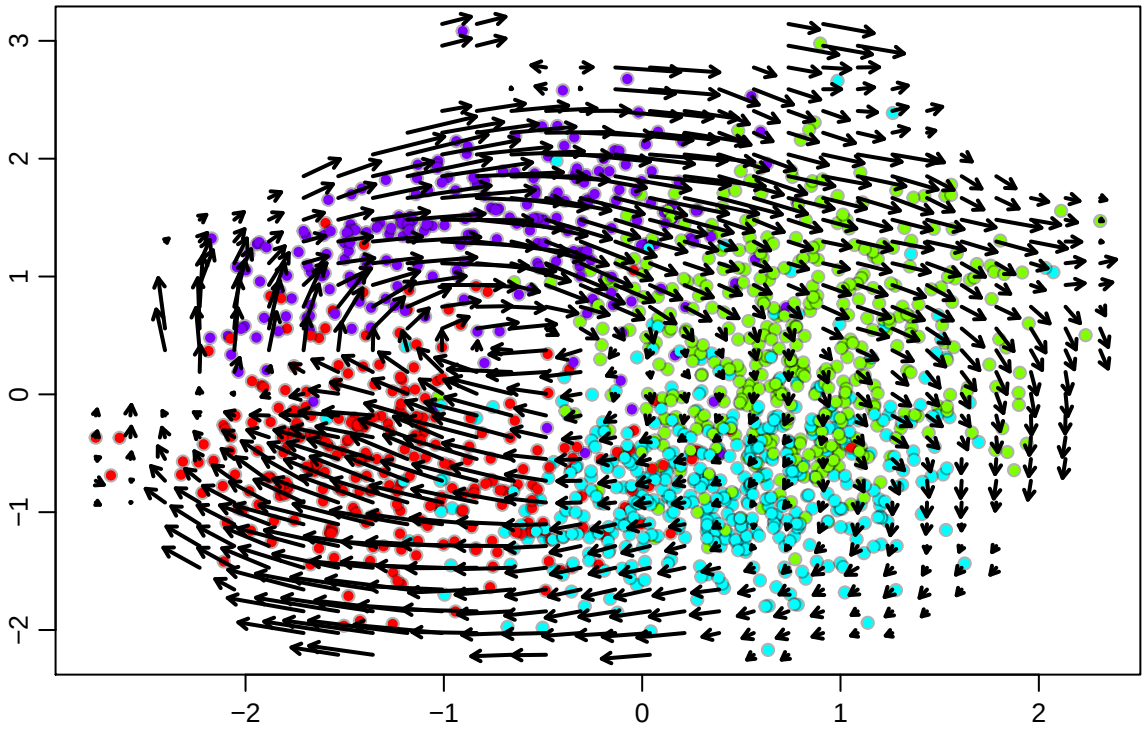
graphViz U2O5

LylaAtta

8/19/2020

RNA velocity (steady state model) projected on PCA embedding.

```
show.velocity.on.embedding.cor(scale(emb.test), rvel.cd, n=100, scale='sqrt', cell.colors=cell.color,ce
```




```
## delta projections ... sqrt knn ... transition probs ... done
## calculating arrows ... done
## grid estimates ... grid.sd= 0.1270606  min.arrow.size= 0.002541212  max.grid.arrow.length= 0.0552977
```

Constructing embedding from velocity projections: For each observed cell_i, find the nearest neighbor, cell_{nn,i}, to it's projected state p_i in the observed cells excluding cell_i. Build a force directed graph where edges are pointing from cell_i to cell_{nn,i}.

Find neighbors, calculate edge weights

```
curr = rvel.cd$current #observed cells
proj = rvel.cd$projected #projected states

ncells = ncol(curr)
cellidx = sapply(seq(1:ncells), function(x) nn2(t(curr[,-x]),t(proj[,x]),k=1)$nn.idx) #index of cell_{n
celldist = sapply(seq(1:ncells), function(x) nn2(t(curr[,-x]),t(proj[,x]),k=1)$nn.dist) #distance betwe
```

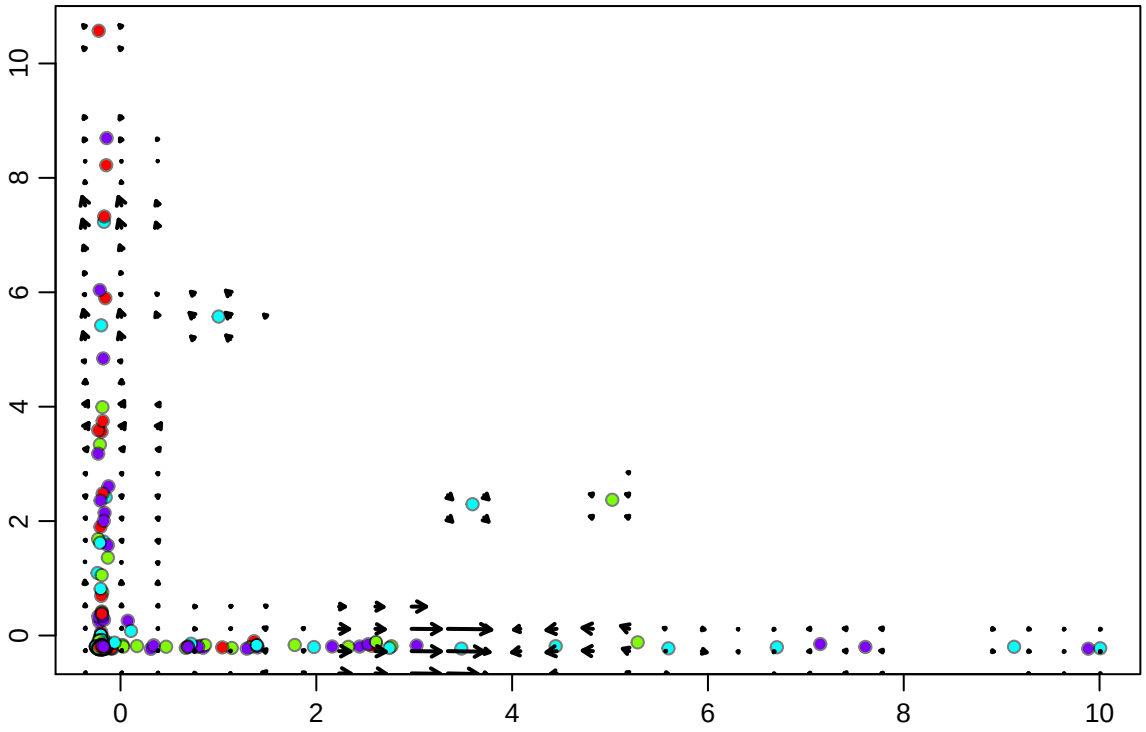
```
for (c in seq(1,length(cellidx))){
  if (cellidx[c]>=c){
    cellidx[c] = cellidx[c] + 1
  }
}

edgeList = cbind(seq(1,ncells),cellidx)
edgeWeights = 1/(1+celldist)
```

G0: force directed graph with no edge weights

```
g0 = graph_from_edgelist(edgeList,directed =TRUE)
g0FD = layout_with_fr(g0)
colnames(g0FD) = c("C1","C2")
rownames(g0FD) = colnames(curr)

show.velocity.on.embedding.cor(scale(g0FD), rvel.cd, n=100, scale='sqrt', cell.colors=cell.color,cex=1,
```

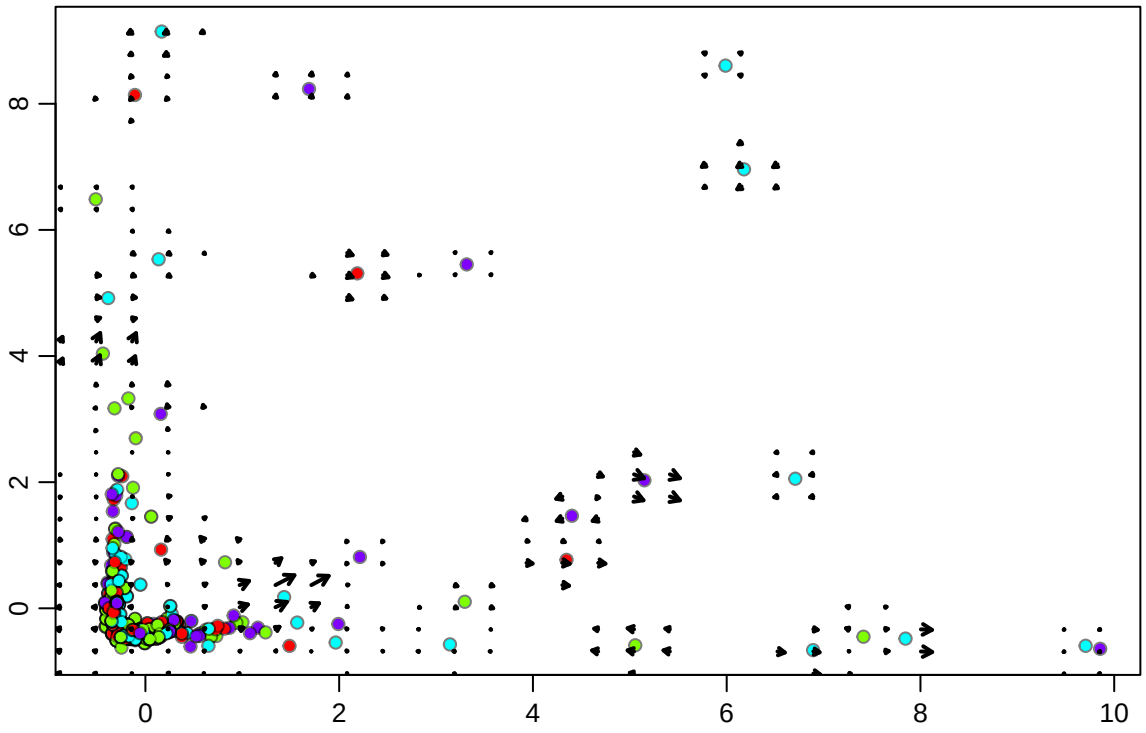



```
## delta projections ... sqrt knn ... transition probs ... done
## calculating arrows ... done
## grid estimates ... grid.sd= 0.2687711  min.arrow.size= 0.005375421  max.grid.arrow.length= 0.0552977
```

G1: force directed graph with edge weights

```
g1 = graph_from_edgelist(edgeList, directed = TRUE)
edge.attributes(g1)$weight = edgeWeights
g1FD = layout_with_fr(g1)
colnames(g1FD) = c("C1","C2")
rownames(g1FD) = colnames(curr)

show.velocity.on.embedding.cor(scale(g1FD), rvel.cd, n=100, scale='sqrt', cell.colors=cell.color,cex=1,
```

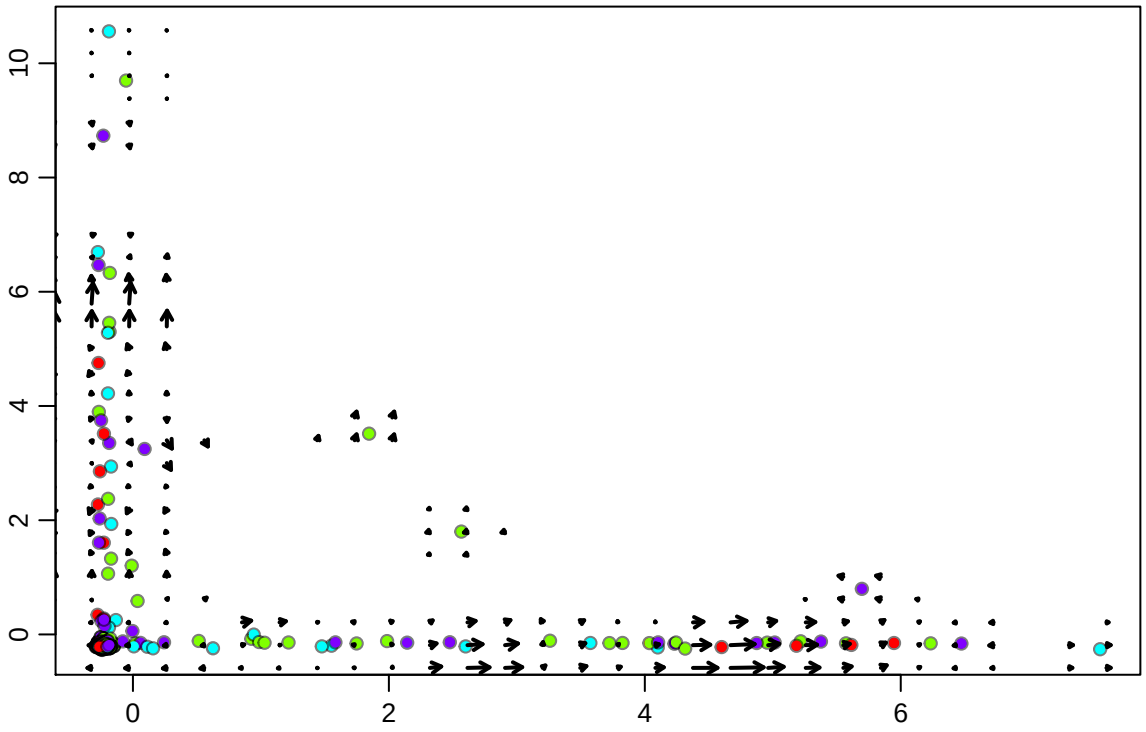



```
## delta projections ... sqrt knn ... transition probs ... done
## calculating arrows ... done
## grid estimates ... grid.sd= 0.255075  min.arrow.size= 0.005101499  max.grid.arrow.length= 0.05529774
```

G2: force directed graph with no edge weights, starting with pca coords

```
g2 = graph_from_edgelist(edgeList,directed =TRUE)
g2FD = layout_with_fr(g2,emb.test)
colnames(g2FD) = c("C1","C2")
rownames(g2FD) = colnames(curr)

show.velocity.on.embedding.cor(scale(g2FD), rvel.cd, n=100, scale='sqrt', cell.colors=cell.color,cex=1,
```

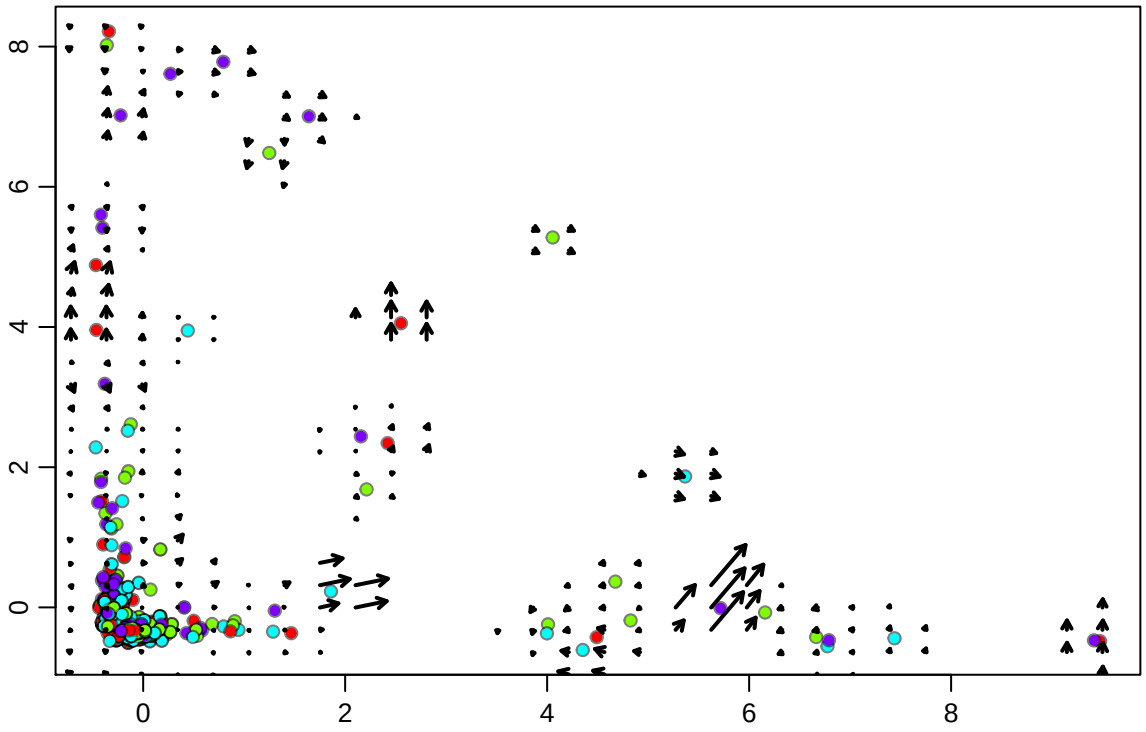



```
## delta projections ... sqrt knn ... transition probs ... done
## calculating arrows ... done
## grid estimates ... grid.sd= 0.2475382  min.arrow.size= 0.004950765  max.grid.arrow.length= 0.0552977
```

G3: force directed graph with edge weights, starting with pca coords

```
g3 = graph_from_edgelist(edgeList, directed = TRUE)
edge.attributes(g3)$weight = edgeWeights
g3FD = layout_with_fr(g3,emb.test)
colnames(g3FD) = c("C1","C2")
rownames(g3FD) = colnames(curr)

show.velocity.on.embedding.cor(scale(g3FD), rvel.cd, n=100, scale='sqrt', cell.colors=cell.color,cex=1,
```




```
## delta projections ... sqrt knn ... transition probs ... done
## calculating arrows ... done
## grid estimates ... grid.sd= 0.2373667  min.arrow.size= 0.004747333  max.grid.arrow.length= 0.0552977
```