Analysis of the Data from Lymphoid Lineage Blood Differentiation

```
clearvars
addpath(genpath('../'))
```

Load the data

```
load data_mpp.mat
data = data';
[N_cell,~] = size(data);
```

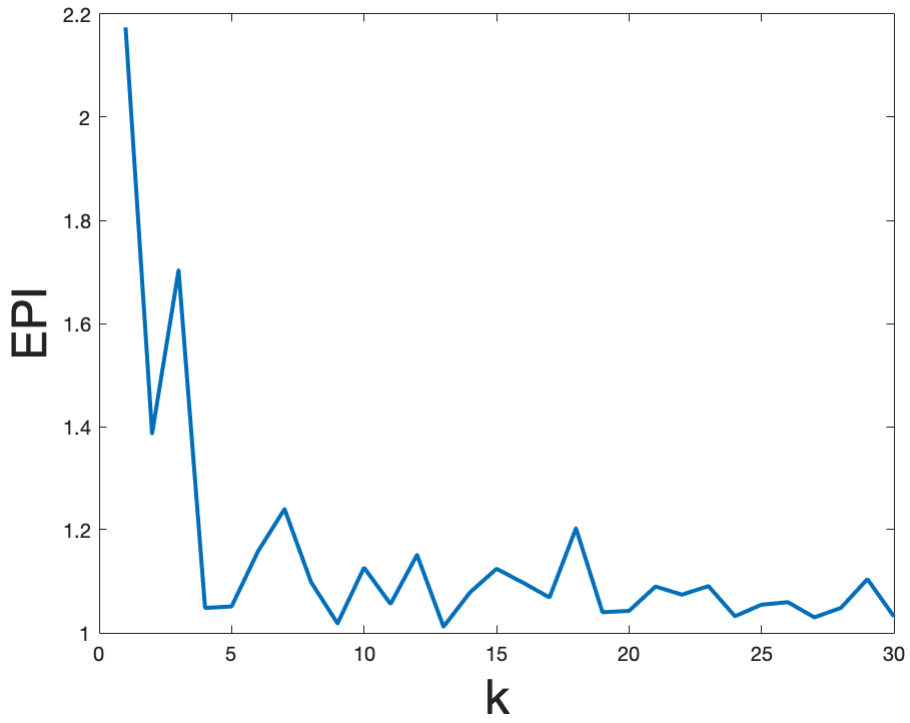
Estimation of Cluster Number

```
par.choice_distance = 'cosine';
out = EstClusterNum(data,par);
```

```
Computed P-values 500 of 2018 datapoint
Computed P-values 1000 of 2018 datapoir
Computed P-values 1500 of 2018 datapoir
Computed P-values 2000 of 2018 datapoir
Mean value of sigma: 0.2594
Minimum value of sigma: 0.17169
Maximum value of sigma: 0.43467
```

```
plot(out.ratio(1:30),'linewidth',2.0)
```

```
xlabel('k', 'FontSize', 24);
ylabel('EPI', 'FontSize', 24);
```



Initial visualization by tSNE

```
rng(1)
Dist = squareform(pdist (data,'cosine'))
ydata = tsne_d(Dist);
```

```
Computed P-values 500 of 2018 datapoint
Computed P-values 1000 of 2018 datapoir
Computed P-values 1500 of 2018 datapoir
Computed P-values 2000 of 2018 datapoir
Mean value of sigma: 0.1537
```

```
Minimum value of sigma: 0.10088
Maximum value of sigma: 0.27062
Iteration 10: error is 49.8475
Iteration 20: error is 47.0807
Iteration 30: error is 46.0238
Iteration 40: error is 45.9552
Iteration 50: error is 45.7846
Iteration 60: error is 45.7518
Iteration 70: error is 45.8181
Iteration 80: error is 45.7725
Iteration 90: error is 45.6994
Iteration 100: error is 2.9944
Iteration 110: error is 2.3854
Iteration 120: error is 2.0264
Iteration 130: error is 1.8718
Iteration 140: error is 1.7827
Iteration 150: error is 1.7229
Iteration 160: error is 1.6801
Iteration 170: error is 1.6469
Iteration 180: error is 1.6207
Iteration 190: error is 1.5994
```

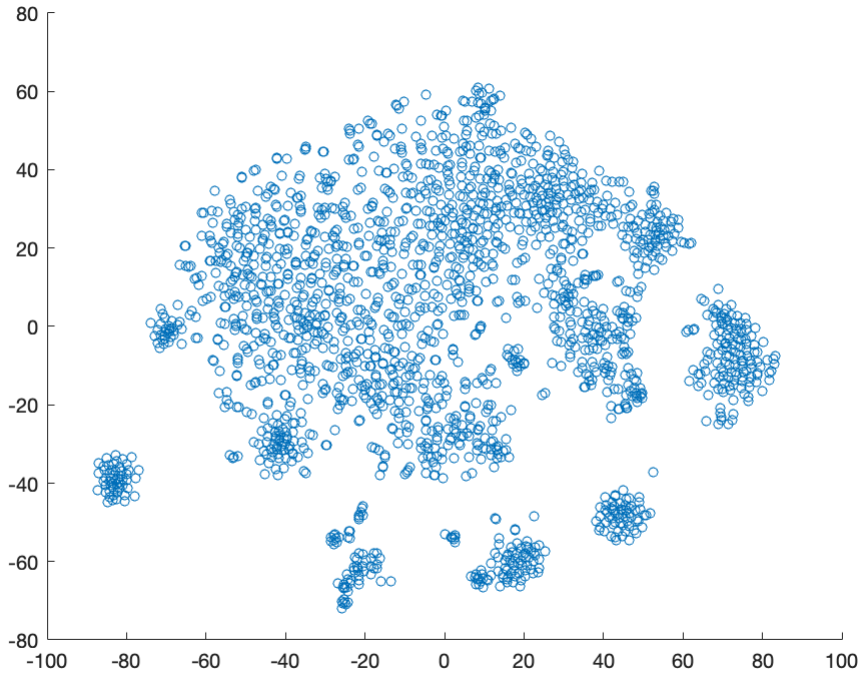
```
Iteration 200: error is 1.5818
Iteration 210: error is 1.5667
Iteration 220: error is 1.5537
Iteration 230: error is 1.5423
Iteration 240: error is 1.5323
Iteration 250: error is 1.5234
Iteration 260: error is 1.5091
Iteration 270: error is 1.4927
Iteration 280: error is 1.4794
Iteration 290: error is 1.4685
Iteration 300: error is 1.4594
Iteration 310: error is 1.4518
Iteration 320: error is 1.4454
Iteration 330: error is 1.4398
Iteration 340: error is 1.435
Iteration 350: error is 1.4307
Iteration 360: error is 1.4269
Iteration 370: error is 1.4236
Iteration 380: error is 1.4206
Iteration 390: error is 1.4179
Iteration 400: error is 1.4155
```

```
Iteration 410: error is 1.4132
Iteration 420: error is 1.4112
Iteration 430: error is 1.4094
Iteration 440: error is 1.4076
Iteration 450: error is 1.406
Iteration 460: error is 1.4046
Iteration 470: error is 1.4033
Iteration 480: error is 1.402
Iteration 490: error is 1.4009
Iteration 500: error is 1.3998
Iteration 510: error is 1.3988
Iteration 520: error is 1.3978
Iteration 530: error is 1.3969
Iteration 540: error is 1.3961
Iteration 550: error is 1.3953
Iteration 560: error is 1.3946
Iteration 570: error is 1.3939
Iteration 580: error is 1.3933
Iteration 590: error is 1.3927
Iteration 600: error is 1.3921
Iteration 610: error is 1.3916
```

```
Iteration 620: error is 1.3911
Iteration 630: error is 1.3906
Iteration 640: error is 1.3901
Iteration 650: error is 1.3897
Iteration 660: error is 1.3892
Iteration 670: error is 1.3888
Iteration 680: error is 1.3885
Iteration 690: error is 1.3881
Iteration 700: error is 1.3878
Iteration 710: error is 1.3874
Iteration 720: error is 1.3871
Iteration 730: error is 1.3868
Iteration 740: error is 1.3865
Iteration 750: error is 1.3862
Iteration 760: error is 1.386
Iteration 770: error is 1.3857
Iteration 780: error is 1.3854
Iteration 790: error is 1.3852
Iteration 800: error is 1.385
Iteration 810: error is 1.3847
Iteration 820: error is 1.3845
```

```
Iteration 830: error is 1.3843
Iteration 840: error is 1.3841
Iteration 850: error is 1.3839
Iteration 860: error is 1.3837
Iteration 870: error is 1.3836
Iteration 880: error is 1.3834
Iteration 890: error is 1.3832
Iteration 900: error is 1.3831
Iteration 910: error is 1.3829
Iteration 920: error is 1.3827
Iteration 930: error is 1.3826
Iteration 940: error is 1.3824
Iteration 950: error is 1.3823
Iteration 960: error is 1.3822
Iteration 970: error is 1.382
Iteration 980: error is 1.3819
Iteration 990: error is 1.3818
Iteration 1000: error is 1.3816
```

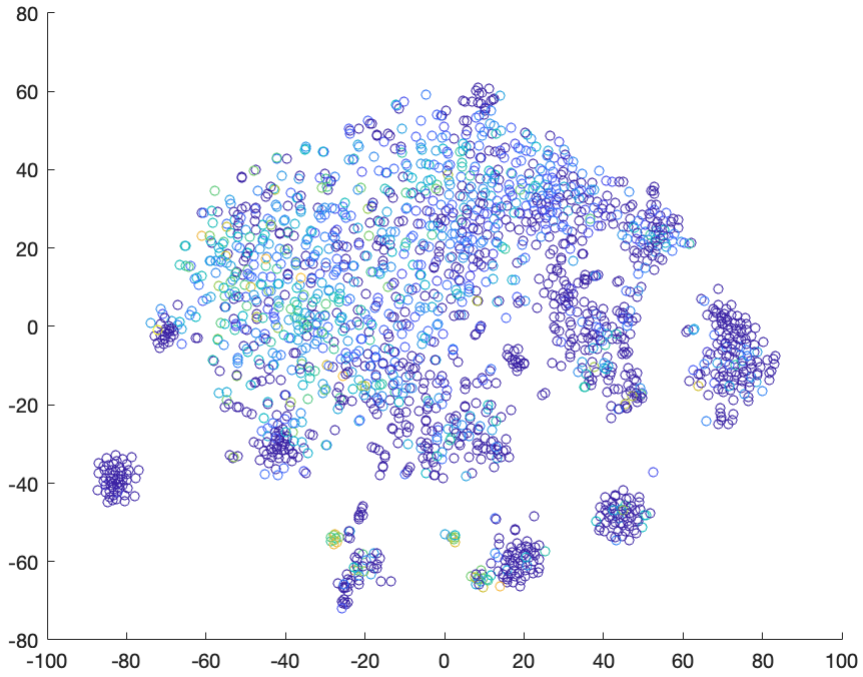
```
score = ydata;
figure;
scatter(score(:,1),score(:,2),22);
```




```
score_tsne = score;
```

Show Some Marker Genes

```
genes_plot = 'Ly6a' ;%% pre-B'Igll1'; %
Index = find(contains(genes,genes_plot)
genes_expression = data(:,Index(1));
figure;
scatter(score(:,1),score(:,2),22,genes_
```




```
%}
```

MuTrans Dynamical Analysis of the Single-Cell Data

parameter and option settings

```
rng(1)
par.initial = 'other';
par.perplex = 800;
par.K_cluster = 10;
par.trials = 10;
par.score = score_tsne;
```

```
par.init_score = score_tsne;

% Dynamical Analysis and Output
tic;
Output = DynamicalAnalysis (data, par);
```

```
Computed P-values 500 of 2018 datapoint
Computed P-values 1000 of 2018 datapoir
Computed P-values 1500 of 2018 datapoir
Computed P-values 2000 of 2018 datapoir
Mean value of sigma: 0.25879
Minimum value of sigma: 0.17126
Maximum value of sigma: 0.43398
J_new = 3.9275
J_new = 3.9109
J_new = 3.8908
J_new = 3.8800
J_new = 3.8777
J_new = 3.8764
J_new = 3.8756
J_new = 3.8750
J_new = 3.8746
```

```
J_new = 3.8739
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8734
J_new = 3.9284
J_new = 3.9131
J_new = 3.8965
J_new = 3.8814
J_new = 3.8778
J_new = 3.8760
J_new = 3.8754
J_new = 3.8747
J_new = 3.8739
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8734
J_new = 3.9284
```

```
J_new = 3.9133
J_new = 3.8971
J_new = 3.8818
J_new = 3.8784
J_new = 3.8762
J_new = 3.8755
J_new = 3.8748
J_new = 3.8740
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8733
J_new = 3.8732
J_new = 3.8736
J_new = 3.9285
J_new = 3.9128
J_new = 3.8955
J_new = 3.8800
J_new = 3.8775
J_new = 3.8762
J_new = 3.8753
```

```
J_new = 3.8748
J_new = 3.8743
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8732
J_new = 3.8731
J_new = 3.8728
J_new = 3.8720
J_new = 3.8713
J_new = 3.8707
J_new = 3.8704
J_new = 3.8703
J_new = 3.8701
J_new = 3.8701
J_new = 3.8701
J_new = 3.9284
J_new = 3.9131
J_new = 3.8965
```

```
J_new = 3.8814
J_new = 3.8778
J_new = 3.8760
J_new = 3.8754
J_new = 3.8747
J_new = 3.8739
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8734
J_new = 3.9491
J_new = 3.9386
J_new = 3.9355
J_new = 3.9331
J_new = 3.9304
J_new = 3.9278
J_new = 3.9249
J_new = 3.9231
J_new = 3.9216
J_new = 3.9204
```

```
J_new = 3.9197
J_new = 3.9184
J_new = 3.9174
J_new = 3.9166
J_new = 3.9161
J_new = 3.9152
J_new = 3.9139
J_new = 3.9127
J_new = 3.9116
J_new = 3.9111
J_new = 3.9101
J_new = 3.9094
J_new = 3.9089
J_new = 3.9088
J_new = 3.9086
J_new = 3.9087
J_new = 3.9302
J_new = 3.9140
J_new = 3.8959
J_new = 3.8809
J_new = 3.8781
```

```
J_new = 3.8764
J_new = 3.8754
J_new = 3.8748
J_new = 3.8744
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8732
J_new = 3.8731
J_new = 3.8728
J_new = 3.8720
J_new = 3.8713
J_new = 3.8707
J_new = 3.8704
J_new = 3.8703
J_new = 3.8701
J_new = 3.8701
J_new = 3.8701
J_new = 3.9285
```

```
J_new = 3.9128
J_new = 3.8955
J_new = 3.8800
J_new = 3.8775
J_new = 3.8762
J_new = 3.8753
J_new = 3.8748
J_new = 3.8743
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8734
J_new = 3.8733
J_new = 3.8732
J_new = 3.8731
J_new = 3.8728
J_new = 3.8720
J_new = 3.8713
J_new = 3.8707
J_new = 3.8704
J_new = 3.8703
```

```
J_new = 3.8701
J_new = 3.8701
J_new = 3.8701
J_new = 3.9284
J_new = 3.9133
J_new = 3.8971
J_new = 3.8818
J_new = 3.8784
J_new = 3.8762
J_new = 3.8755
J_new = 3.8748
J_new = 3.8740
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8733
J_new = 3.8732
J_new = 3.8736
J_new = 3.9284
J_new = 3.9133
J_new = 3.8971
```

```
J_new = 3.8818
J_new = 3.8784
J_new = 3.8762
J_new = 3.8755
J_new = 3.8748
J_new = 3.8740
J_new = 3.8737
J_new = 3.8736
J_new = 3.8735
J_new = 3.8733
J_new = 3.8732
J_new = 3.8736
E_best = 0.5804
```

Iteration	Func-count	f(x)
0	1	3.90558
1	6	3.87904
2	7	3.84528
3	8	3.83661
4	9	3.81351
5	10	3.80266

6	11	3.79805
7	12	3.79168
8	13	3.7867
9	14	3.78246
10	15	3.77999
11	16	3.77696
12	17	3.77317
13	18	3.77204
14	19	3.7683
15	21	3.76099
16	23	3.75698
17	25	3.75365
18	27	3.75209
19	29	3.75055

Iteration	Func-count	f(x)
20	31	3.74851
21	33	3.74725
22	35	3.7462
23	37	3.74485
24	39	3.74371

25	41	3.74253
26	43	3.74162
27	45	3.74047
28	47	3.74004
29	49	3.7385
30	51	3.73766
31	53	3.73651
32	55	3.73568
33	57	3.73502
34	59	3.73437
35	61	3.73374
36	63	3.73329
37	65	3.73263
38	67	3.73182
39	69	3.73122

Iteration	Func-count	f(x)
40	71	3.7309
41	73	3.73054
42	75	3.73026
43	77	3.72983

44	79	3.72911
45	81	3.72881
46	84	3.7284
47	86	3.72801
48	88	3.72748
49	90	3.72713
50	92	3.72681
51	94	3.72656
52	96	3.72618
53	98	3.72594
54	100	3.72558
55	102	3.72535
56	104	3.72503
57	106	3.72481
58	108	3.72468
59	110	3.72449

Iteration	Func-count	f(x)
60	112	3.72437
61	114	3.72425
62	116	3.72412

63	117	3.7238
64	119	3.72367
65	121	3.72347
66	123	3.72332
67	124	3.72319
68	126	3.72296
69	128	3.72269
70	130	3.7225
71	132	3.72242
72	134	3.72232
73	136	3.72227
74	138	3.72221
75	140	3.72214
76	142	3.72209
77	144	3.72203
78	146	3.72195
79	148	3.7219

Iteration	Func-count	f(x)
80	149	3.72184
81	151	3.72177

82	153	3.72173
83	154	3.7216
84	156	3.72152
85	158	3.72145
86	159	3.72142
87	160	3.72119
88	162	3.72111
89	164	3.721
90	166	3.72095
91	168	3.72088
92	170	3.72085
93	172	3.7208
94	174	3.72076
95	175	3.72063
96	177	3.7206
97	178	3.72058
98	179	3.72055
99	181	3.72045

Iteration	Func-count	f(x)
100	183	3.72038

101	185	3.72035
102	187	3.72032
103	189	3.72029
104	191	3.72022
105	193	3.72018
106	195	3.72007
107	197	3.71998
108	199	3.7199
109	200	3.71987
110	202	3.7198
111	204	3.71974
112	206	3.71972
113	208	3.71969
114	210	3.71967
115	211	3.71964
116	213	3.71958
117	214	3.71952
118	216	3.71947
119	217	3.71941

Iteration	Func-count	f(x)

120	219	3.71933
121	221	3.71929
122	223	3.71923
123	225	3.7192
124	226	3.71919
125	228	3.71917
126	229	3.71916
127	230	3.71915
128	232	3.71913
129	234	3.71912
130	236	3.71911
131	238	3.7191
132	239	3.71908
133	241	3.71902
134	243	3.71901
135	246	3.71888
136	250	3.71887
137	251	3.71878
138	253	3.71871
139	255	3.71865

Iteration	Func-count	f(x)
140	257	3.71862
141	259	3.7186
142	261	3.71858
143	262	3.71857
144	263	3.71856
145	264	3.71855
146	265	3.71854
147	266	3.71851
148	268	3.71846
149	270	3.71844
150	272	3.71842
151	274	3.7184
152	275	3.7184
153	276	3.71837
154	278	3.71833
155	280	3.71832
156	281	3.71825
157	283	3.71823
158	285	3.7182
159	286	3.71819

Iteration	Func-count	f(x)
160	287	3.71814
161	289	3.7181
162	291	3.71808
163	293	3.71807
164	294	3.71807
165	295	3.71806
166	297	3.71803
167	299	3.71803
168	300	3.71801
169	301	3.71801
170	302	3.718
171	303	3.71799
172	305	3.71792
173	308	3.71792
174	309	3.7179
175	311	3.71789
176	313	3.71787
177	315	3.71786
178	316	3.71785

179	317	3.71783

Iteration	Func-count	f(x)
180	319	3.71782
181	321	3.7178
182	323	3.71777
183	325	3.71776
184	326	3.71773
185	328	3.71769
186	331	3.71767
187	333	3.71764
188	335	3.71762
189	337	3.71757
190	339	3.71756
191	341	3.71756
192	343	3.71755
193	344	3.71755
194	345	3.71755
195	346	3.71754
196	348	3.71753
197	350	3.7175

Iteration	Func-count	f(x)
198	353	3.71749
199	355	3.71747
200	356	3.71744
201	357	3.71743
202	358	3.71742
203	359	3.71742
204	360	3.71741
205	361	3.71741
206	362	3.7174
207	363	3.7174
208	364	3.71739
209	365	3.71739
210	366	3.71738
211	368	3.71737
212	370	3.71737
213	371	3.71737
214	372	3.71737
215	373	3.71736
216	374	3.71735

217	377	3.71731
218	379	3.7173
219	380	3.71728

Iteration	Func-count	f(x)
220	381	3.71726
221	382	3.71726
222	383	3.71724
223	384	3.71723
224	385	3.71722
225	386	3.71722
226	387	3.71722
227	388	3.71721
228	390	3.71721
229	392	3.7172
230	393	3.7172
231	394	3.7172
232	395	3.7172
233	397	3.71719
234	399	3.71719
235	400	3.71719

236	401	3.71719
237	402	3.71719
238	403	3.71718
239	404	3.71718

Iteration	Func-count	f(x)
240	406	3.71717
241	408	3.71716
242	409	3.71716
243	410	3.71715
244	412	3.71714
245	414	3.71713
246	416	3.71713
247	417	3.71713
248	418	3.71713
249	419	3.71713
250	420	3.71711
251	424	3.71706
252	427	3.71705
253	428	3.71699
254	429	3.7169

255	431	3.71687
256	433	3.71685
257	435	3.71684
258	436	3.71683
259	437	3.71682

Iteration	Func-count	f(x)
260	438	3.71681
261	439	3.7168
262	440	3.7168
263	441	3.71679
264	443	3.71678
265	445	3.71678
266	446	3.71677
267	448	3.71677
268	449	3.71677
269	450	3.71676
270	451	3.71676
271	453	3.71675
272	454	3.71675
273	455	3.71674

274	457	3.71673
275	459	3.71673
276	460	3.71673
277	462	3.71672
278	463	3.71672
279	464	3.71672

Iteration	Func-count	f(x)
280	469	3.71659
281	473	3.71659
282	474	3.71656
283	475	3.71652
284	477	3.7165
285	478	3.71649
286	479	3.71648
287	481	3.71646
288	482	3.71645
289	484	3.71643
290	486	3.71643
291	487	3.71642
292	489	3.71642

293	490	3.71642
294	491	3.71641
295	492	3.71641
296	493	3.71641
297	494	3.71641
298	495	3.71641
299	496	3.7164

Iteration	Func-count	f(x)
300	497	3.7164
301	498	3.7164
302	499	3.7164
303	501	3.7164
304	502	3.7164
305	503	3.7164
306	504	3.7164
307	505	3.7164
308	507	3.71639
309	510	3.71639
310	511	3.71639
311	512	3.71639

312	513	3.71638
313	514	3.71638
314	516	3.71638
315	517	3.71637
316	518	3.71637
317	519	3.71636
318	521	3.71636
319	523	3.71636

Iteration	Func-count	f(x)
320	524	3.71636
321	525	3.71636
322	526	3.71636
323	527	3.71636
324	528	3.71636
325	529	3.71636
326	534	3.71635
327	536	3.71635
328	537	3.71635
329	538	3.71634
330	540	3.71633

331	541	3.71633
332	542	3.71633
333	543	3.71633
334	544	3.71633
335	546	3.71633
336	547	3.71633
337	548	3.71633
338	549	3.71633
339	550	3.71633

Iteration	Func-count	f(x)
340	551	3.71633
341	552	3.71632
342	553	3.71632
343	554	3.71632
344	555	3.71632
345	556	3.71632
346	557	3.71632
347	558	3.71632
348	559	3.71632
349	561	3.71632

350	564	3.71632
351	565	3.71631
352	566	3.71631
353	567	3.71631
354	568	3.7163
355	569	3.7163
356	570	3.7163
357	571	3.7163
358	572	3.71629
359	573	3.71629

Iteration	Func-count	f(x)
360	574	3.71627
361	577	3.71626
362	580	3.71625
363	582	3.71623
364	583	3.7162
365	585	3.71618
366	587	3.71616
367	589	3.71614
368	590	3.71614

369	591	3.71613
370	592	3.71613
371	593	3.71612
372	594	3.71612
373	595	3.71612
374	596	3.71612
375	597	3.71612
376	598	3.71611
377	600	3.71611
378	601	3.71611
379	602	3.71611

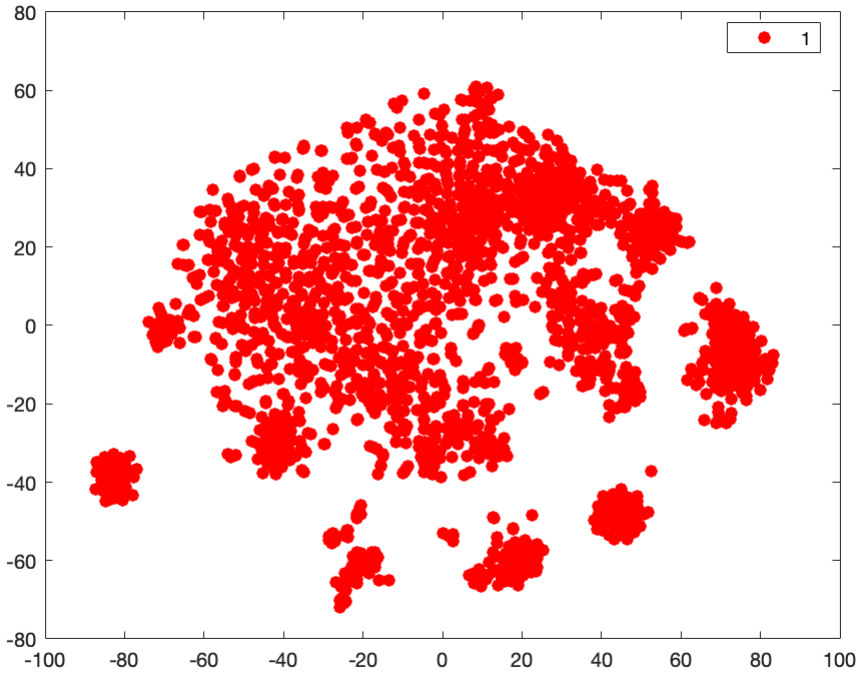
Iteration	Func-count	f(x)
380	604	3.71611
381	605	3.71611
382	606	3.71611
383	607	3.71611
384	608	3.71611
385	609	3.71611
386	610	3.7161
387	611	3.7161

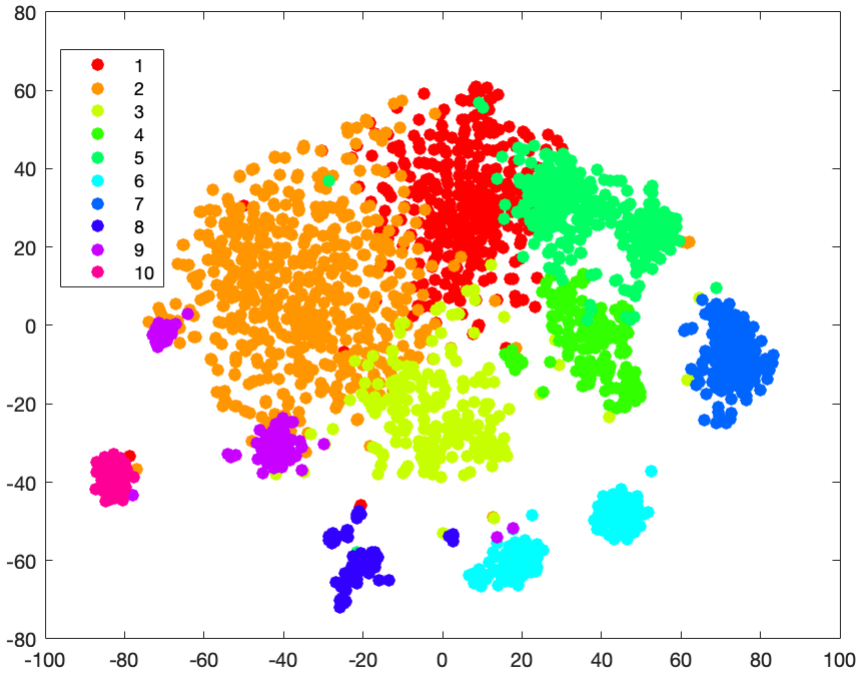
```
   388          614           3.7161
   389          617           3.7161
   390          618          3.71609
   391          619          3.71609
   392          620          3.71608
   393          621          3.71608
   394          622          3.71608
   395          624          3.71607
   396          626          3.71607
   397          628          3.71606
   398          630          3.71606
   399          631          3.71606

 Iteration  Func-count       f(x)
   400          632          3.71606
   401          633          3.71606
   402          634          3.71606

Optimization completed: The first-order
than options.OptimalityTolerance = 1.00
```

```
Elapsed time is 10879.987367 seconds.
```






```
toc;
```

```
Elapsed time is 10889.274322 seconds.
```

```
class_order = Output.class_order;
data_perm = Output.data_perm;
k = par.K_cluster;
perm_class = Output.perm_class;
```

Cell-fate Landscape

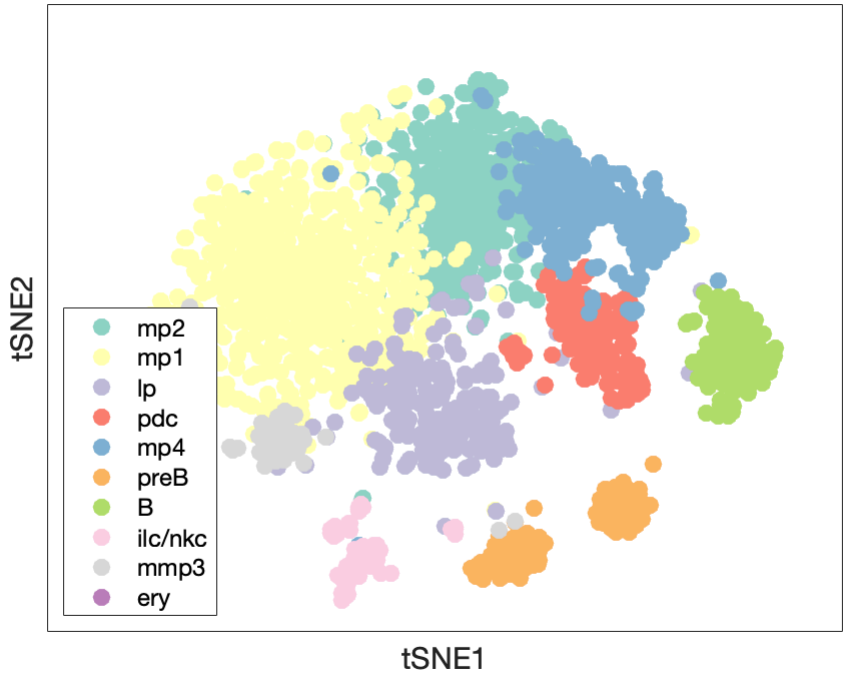
embeddings and centers

```
name_cluster = {'mp2','mp1','lp','pdc',
colors_cluster = brewermap(k,'set3');
labs_perm = Output.labs_perm;

Output.embedding_2d = score_tsne(perm_c
score_2d = score_tsne(perm_class,:);

figure;
gscatter(score_2d(:,1),score_2d(:,2),cl
legend(name_cluster,'Fontsize',12,'Loca
set(gca,'xtick',[],'ytick',[]);
```

```
xlabel('tSNE1','Fontsize',15)
ylabel('tSNE2','Fontsize',15)
```



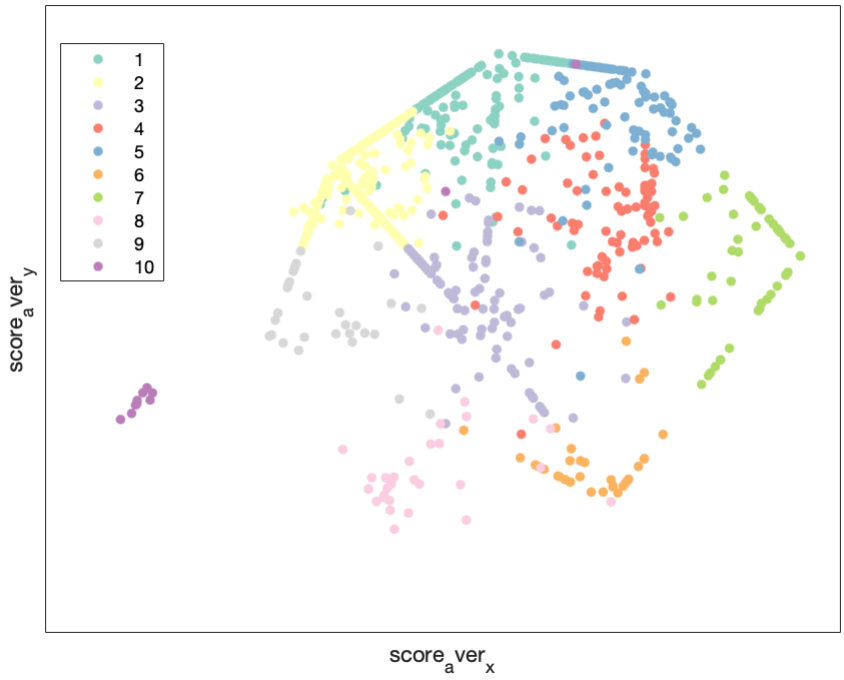

```
Output.embedding_2d = score_2d;


% construct landscape
par.thresh_calc_center = 0.9;
par.thresh_calc_cov = 0.2;
par.N_mesh = 1000;
par.mksize = 15;
par.scaleaxis = 1.1;
```

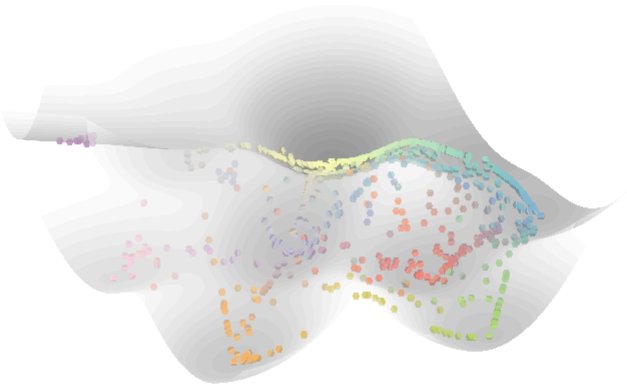
```
par.scalevalue = 1.0;
par.fontsize = 30;
par.alpha = 0.4;

par.plot_label = class_order;
par.legend_text = name_cluster;
par.colors = colors_cluster;
par.color_mixing = true;

land = ConstructLandscape (Output, par)
```



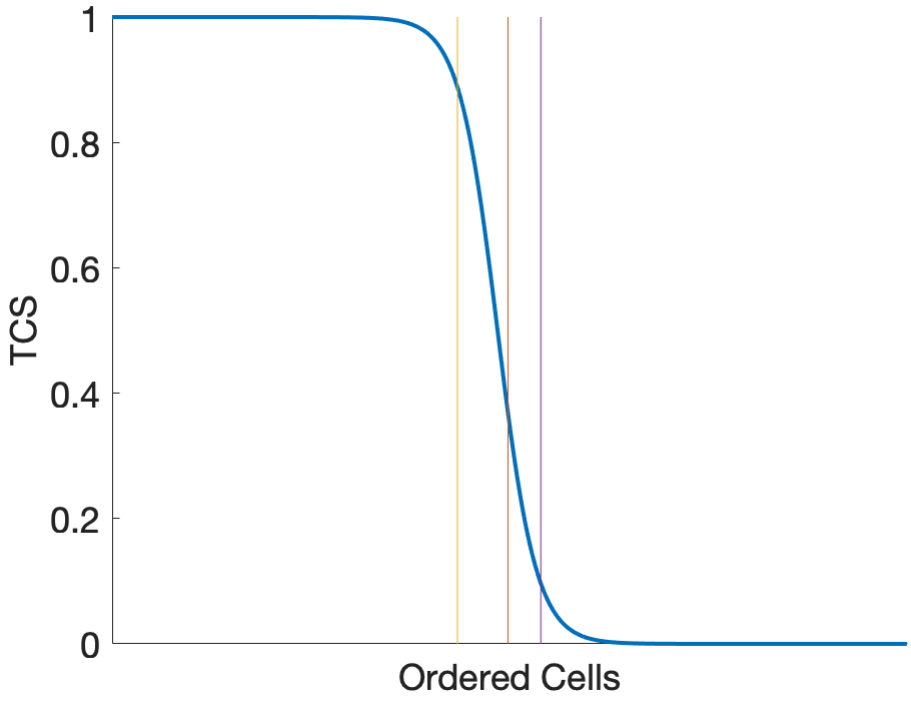

```
view([49 77])
```



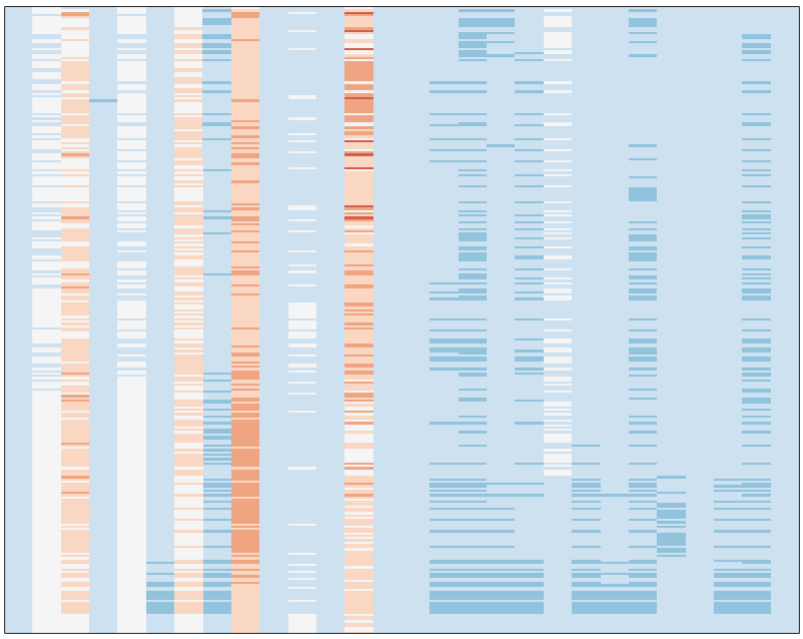
Transcendental transition cell and gene analysis

```
par.genes = genes;
par.true_labs = labs_perm;
par.thresh_otherkeep = 0.3;
par.thresh_de_pvalues = 5e-3;
par.thresh_ms_pvalues = 1e-2;
par.thresh_tcs = 0.4;
par.thresh_td_genes = 0.4;
par.colors = colors_cluster ;
par.L_select_top_genes = 5;
```

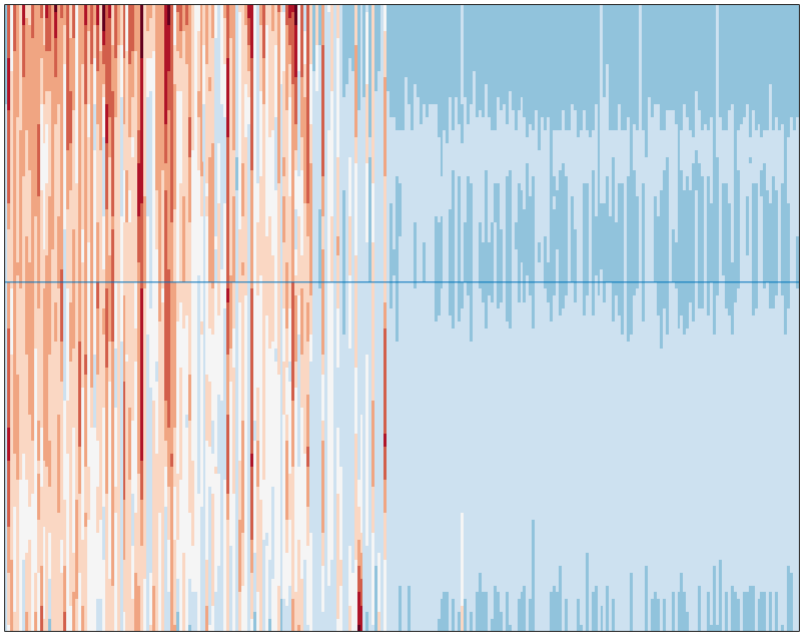
```
par.flip = false;
par.display_genes_label = false;
par.output_heatmap = true;
% check the state id before preceeding
% clustering id. Results unchanged.
out = GeneAnalysis(7, 6, Output,par);
```



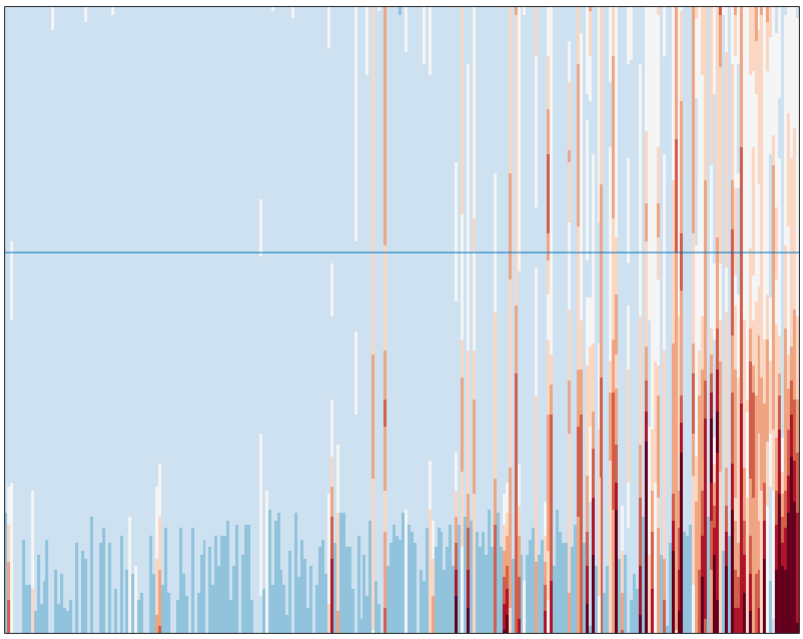
Below is the heatmap of transition gene



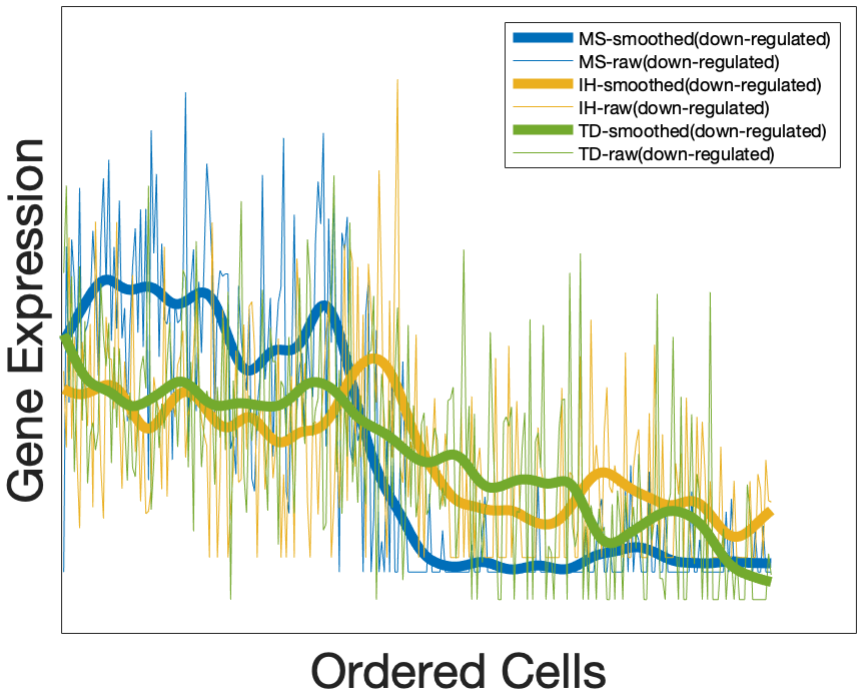
Below is the heatmap of down-regulated

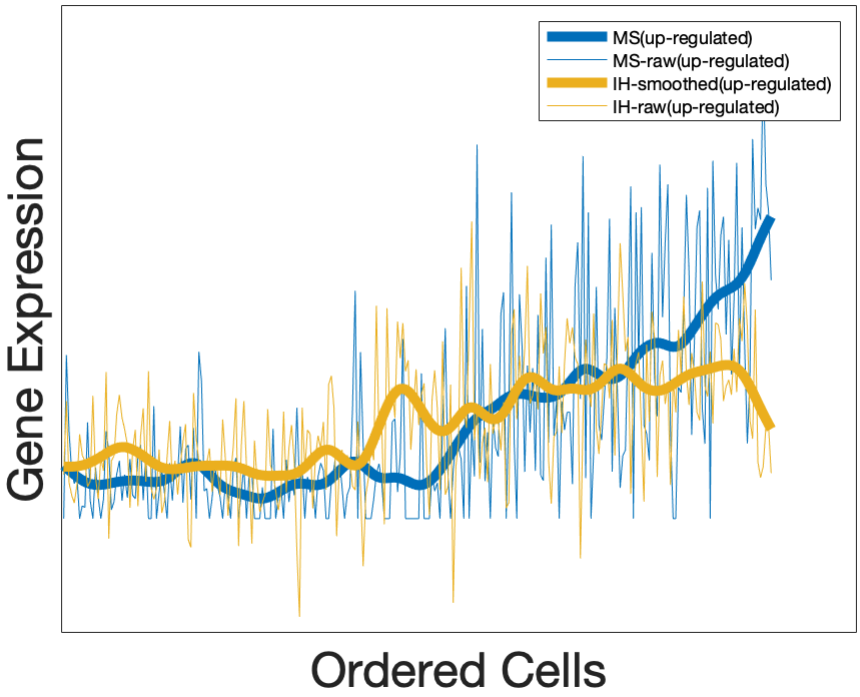


Below is the heatmap of up-regulated MS



Below is the gradual cell indentity cha





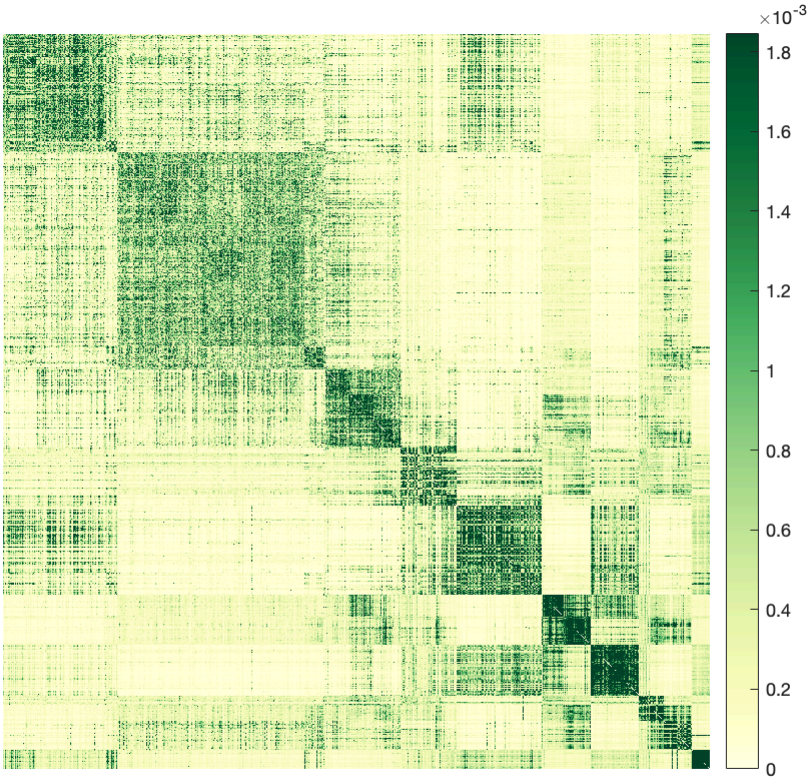
output other data in Supplementary

```
rho_class = Output.rho_class;
```

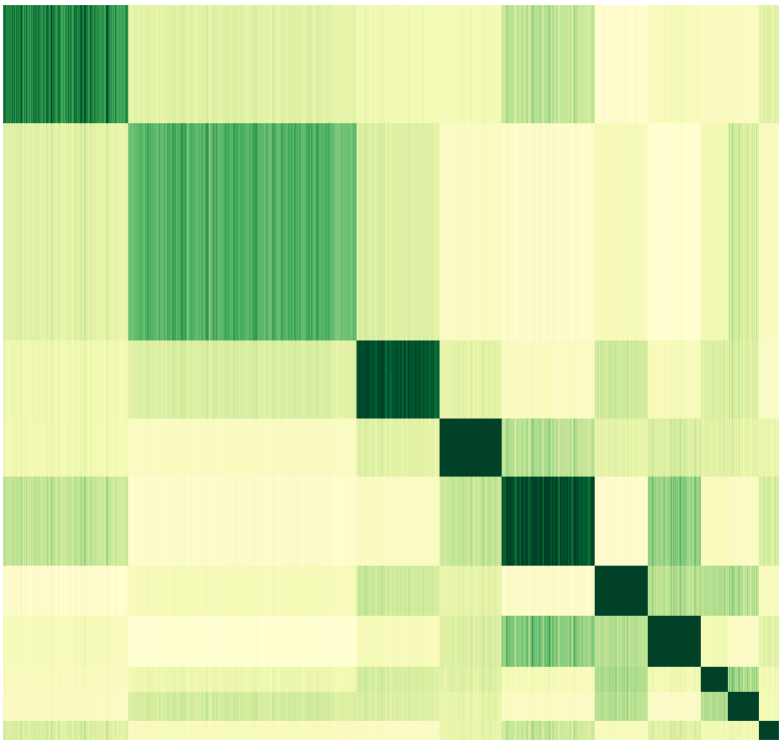
```
perm_class = Output.perm_class;
P_hat = Output.P_hat;
P_appr_perm = Output.P_appr_perm;
P_perm = Output.P_perm;
P_rho = Output.P_rho;
labs_perm = Output.labs_perm;
mu_hat = Output.mu_hat;
k = Output.k;
H = Output.H;

max_P = 0.2* max(max(P_rho));
c_lim = [0 max_P];
cmp = 'ylgn';

figure('rend','painters','pos',[10 10 5
colormap(brewermap([],cmp))
imagesc(P_perm);
axis off
set(gca,'xtick',[],'ytick',[]);
caxis(c_lim)
colorbar;
```

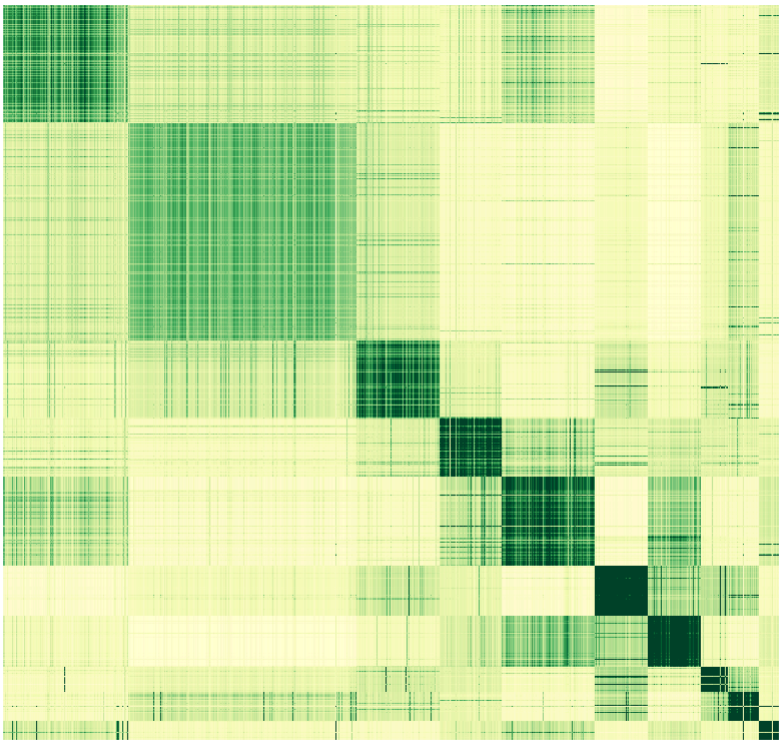



```
figure('rend','painters','pos',[10 10 5
colormap(brewermap([],cmp))
imagesc(P_appr_perm);
axis off
set(gca,'xtick',[],'ytick',[]);
caxis(c_lim)
```

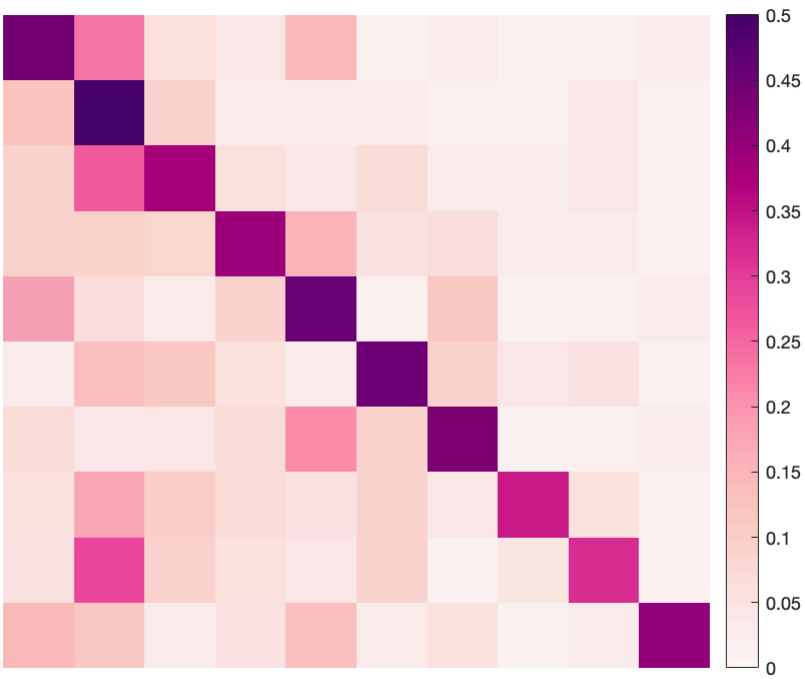


```
%colorbar;

figure('rend','painters','pos',[10 10 5
colormap(brewermap([],cmp))
imagesc(P_rho);
axis off
set(gca,'xtick',[],'ytick',[]);
caxis(c_lim)
%colorbar;
box off
```

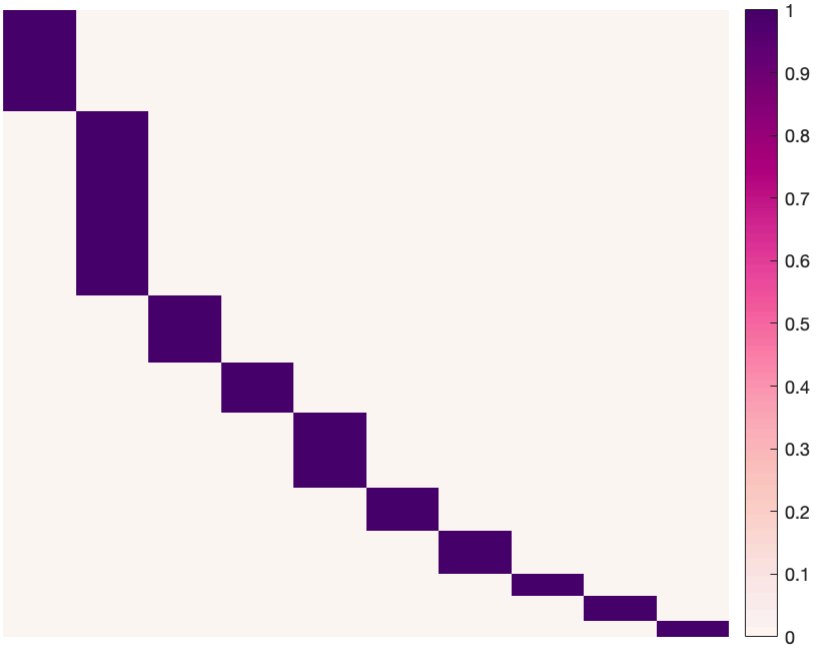


```
cmp = 'rdpu';
figure('rend','painters','pos',[10 10 5
colormap(brewermap([],cmp))
imagesc(P_hat);
caxis([0 0.5])
axis off
set(gca,'xtick',[],'ytick',[]);
box off
colorbar;
```

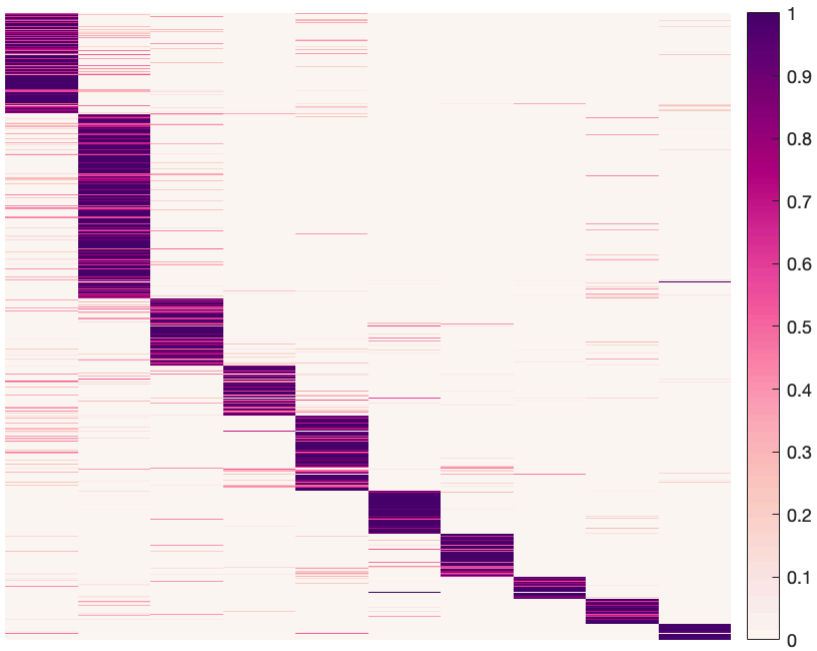



```
figure;
for id_cluster  = 1:k
member(:,id_cluster) = (class_order ==
end
colormap(brewermap([],cmp))
imagesc(member);
caxis([0 1])
colorbar;
axis off
set(gca,'xtick',[],'ytick',[]);
```

```
box off
```




```
figure;
colormap(brewermap([],cmp))
imagesc(rho_class);
caxis([0 1])
colorbar;
axis off
set(gca,'xtick',[],'ytick',[]);
box off
```


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0