

The optimal number of clusters K is set as the most frequently found K from the 100 simulations tabulated above. It is found by using the BIC criterion after running the unpenalized EM algorithm on K spanning from 2 to 7.

Using the last set of simulated counts, I ran a grid search across varying tuning parameters. As done in Pan et al, I fixed $\lambda_1 = 1$, and searched over $\lambda_2 = (0.1, 0.2, \dots, .2)$ and $\tau = (0.1, 0.2, \dots, 2)$.

Then, using the optimal K and penalty parameters, I ran 100 simulations. The results of these simulations are below:

Below are the summary of results:

	True.K	log.fold.change	True.Num.Nondisc	K	lambda2	tau	ARI	Num.Nondisc	Sensitivity	False.Positive
1	2.00	0.30	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2.00	0.30	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	2.00	0.30	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2.00	0.30	75.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2.00	0.30	90.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2.00	0.50	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	2.00	0.50	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	2.00	0.50	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	2.00	0.50	75.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	2.00	0.50	90.00	2.00	0.20	0.10	1.00	0.13	0.96	0.02
11	2.00	1.00	10.00	2.00	0.10	0.10	1.00	0.89	1.00	0.01
12	2.00	1.00	25.00	2.00	0.30	0.10	1.00	0.75	1.00	0.00
13	2.00	1.00	50.00	2.00	0.30	0.10	1.00	0.50	1.00	0.01
14	2.00	1.00	75.00	2.00	0.10	0.30	1.00	0.25	1.00	0.00
15	2.00	1.00	90.00	2.00	0.10	0.10	1.00	0.10	1.00	0.02
16	3.00	0.30	10.00	3.00	0.20	0.10	0.94	0.87	0.92	0.04
17	3.00	0.30	25.00	3.00	0.20	0.90	1.00	0.85	0.60	0.00
18	3.00	0.30	50.00	3.00	0.10	0.10	0.97	0.48	0.98	0.06
19	3.00	0.30	75.00	3.00	0.10	0.10	0.97	0.27	0.96	0.04
20	3.00	0.30	90.00	3.00	0.10	0.10	0.92	0.13	0.96	0.05
21	3.00	0.50	10.00	3.00	0.10	0.40	0.98	0.89	1.00	0.01
22	3.00	0.50	25.00	3.00	0.30	0.10	0.98	0.74	0.99	0.02
23	3.00	0.50	50.00	3.00	0.30	0.10	0.98	0.50	0.98	0.01
24	3.00	0.50	75.00	3.00	0.10	0.10	0.98	0.24	1.00	0.04
25	3.00	0.50	90.00	3.00	0.10	0.10	0.96	0.10	1.00	0.06
26	3.00	1.00	10.00	3.00	0.20	0.20	0.98	0.89	1.00	0.01
27	3.00	1.00	25.00	3.00	0.50	0.10	0.98	0.75	1.00	0.01
28	3.00	1.00	50.00	3.00	0.10	0.40	0.96	0.50	1.00	0.00
29	3.00	1.00	75.00	3.00	0.10	0.30	0.98	0.25	1.00	0.00
30	3.00	1.00	90.00	3.00	0.20	0.10	0.98	0.10	1.00	0.03
31	4.00	0.30	10.00	3.00	0.10	0.20	0.96	0.88	0.99	0.03
32	4.00	0.30	25.00	3.00	0.10	0.20	0.98	0.73	0.99	0.03
33	4.00	0.30	50.00	3.00	0.10	0.10	0.96	0.48	1.00	0.05
34	4.00	0.30	75.00	3.00	0.10	0.10	0.95	0.25	0.99	0.03
35	4.00	0.30	90.00	4.00	0.10	0.10	0.83	0.10	0.99	0.04
36	4.00	0.50	10.00	3.00	0.10	0.30	0.98	0.89	1.00	0.01
37	4.00	0.50	25.00	3.00	0.10	0.30	0.97	0.74	0.99	0.01
38	4.00	0.50	50.00	3.00	0.30	0.10	0.99	0.50	1.00	0.01
39	4.00	0.50	75.00	3.00	0.10	0.20	0.99	0.25	1.00	0.00
40	4.00	0.50	90.00	3.00	0.10	0.20	0.84	0.10	1.00	0.01
41	4.00	1.00	10.00	3.00	0.20	0.30	0.97	0.89	1.00	0.01
42	4.00	1.00	25.00	3.00	0.20	0.50	0.99	0.75	1.00	0.00
43	4.00	1.00	50.00	3.00	0.30	0.30	0.98	0.50	1.00	0.00
44	4.00	1.00	75.00	4.00	0.10	0.30	0.99	0.25	1.00	0.00
45	4.00	1.00	90.00	3.00	0.40	0.10	0.99	0.10	1.00	0.00
46	5.00	0.30	10.00	4.00	0.10	0.30	0.89	0.89	1.00	0.01
47	5.00	0.30	25.00	4.00	0.10	0.30	0.89	0.73	0.99	0.02
48	5.00	0.30	50.00	4.00	0.10	0.10	0.96	0.46	1.00	0.07
49	5.00	0.30	75.00	4.00	0.10	0.10	0.95	0.24	1.00	0.04
50	5.00	0.30	90.00	5.00	0.10	0.10	0.73	0.09	1.00	0.07
51	5.00	0.50	10.00	4.00	0.20	0.20	0.94	0.88	1.00	0.02
52	5.00	0.50	25.00	4.00	0.20	0.20	0.98	0.73	1.00	0.02
53	5.00	0.50	50.00	4.00	0.10	0.30	0.98	0.49	1.00	0.01
54	5.00	0.50	75.00	3.00	0.20	0.10	0.98	0.25	1.00	0.01
55	5.00	0.50	90.00	5.00	0.20	0.10	0.73	0.10	1.00	0.03
56	5.00	1.00	10.00	4.00	0.10	0.40	0.98	0.89	1.00	0.01
57	5.00	1.00	25.00	4.00	0.40	0.50	0.99	0.75	1.00	0.00
58	5.00	1.00	50.00	3.00	0.50	0.10	0.99	0.50	1.00	0.00
59	5.00	1.00	75.00	4.00	0.10	0.40	0.98	0.25	1.00	0.00
60	5.00	1.00	90.00	4.00	0.10	0.30	0.87	0.10	1.00	0.00
61	6.00	0.30	10.00	5.00	0.10	0.30	0.88	0.88	1.00	0.02
62	6.00	0.30	25.00	4.00	0.10	0.30	0.83	0.73	1.00	0.02
63	6.00	0.30	50.00	4.00	0.10	0.10	0.89	0.45	1.00	0.09
64	6.00	0.30	75.00	4.00	0.10	0.10	0.85	0.24	1.00	0.05
65	6.00	0.30	90.00	4.00	0.10	1.10	0.81	0.13	0.97	0.00
66	6.00	0.50	10.00	4.00	0.10	0.40	0.94	0.89	1.00	0.01
67	6.00	0.50	25.00	4.00	0.10	0.50	0.95	0.75	1.00	0.01
68	6.00	0.50	50.00	4.00	0.20	0.10	0.96	0.48	1.00	0.03
69	6.00	0.50	75.00	3.00	0.10	0.10	0.94	0.24	1.00	0.05
70	6.00	0.50	90.00	4.00	0.10	1.90	0.66	0.10	1.00	0.00
71	6.00	1.00	10.00	4.00	0.10	0.50	0.95	0.89	1.00	0.01
72	6.00	1.00	25.00	4.00	0.40	0.20	0.97	0.75	1.00	0.01
73	6.00	1.00	50.00	4.00	0.10	0.50	0.98	0.50	1.00	0.00
74	6.00	1.00	75.00	5.00	0.20	0.40	0.97	0.25	1.00	0.00
75	6.00	1.00	90.00	2.00	0.40	0.10	0.55	0.10	1.00	0.02
76	7.00	0.30	10.00	5.00	0.10	0.20	0.82	0.83	1.00	0.07
77	7.00	0.30	25.00	3.00	0.10	0.20	0.80	0.69	1.00	0.08
78	7.00	0.30	50.00	5.00	0.10	0.20	0.81	0.47	1.00	0.06
79	7.00	0.30	75.00	3.00	0.10	0.10	0.74	0.23	1.00	0.07
80	7.00	0.30	90.00	3.00	0.10	0.10	0.66	0.09	1.00	0.11
81	7.00	0.50	10.00	6.00	0.20	0.20	0.85	0.87	1.00	0.04
82	7.00	0.50	25.00	3.00	0.10	0.20	0.84	0.69	1.00	0.08
83	7.00	0.50	50.00	4.00	0.20	0.10	0.87	0.47	1.00	0.06
84	7.00	0.50	75.00	4.00	0.20	0.10	0.84	0.24	1.00	0.03
85	7.00	0.50	90.00	4.00	0.20	0.10	0.54	0.09	1.00	0.06
86	7.00	1.00	10.00	4.00	0.10	0.50	0.90	0.89	1.00	0.01
87	7.00	1.00	25.00	3.00	0.10	0.40	0.89	0.73	1.00	0.02
88	7.00	1.00	50.00	4.00	0.10	0.60	0.92	0.50	1.00	0.01
89	7.00	1.00	75.00	4.00	0.40	0.10	0.82	0.24	1.00	0.03
90	7.00	1.00	90.00	4.00	0.30	0.40	0.66	0.10	1.00	0.00