

Part I a)

- Mean(D):

[97.69496 3.80187 21.68657 40.25974 20.34122 40.42042 22.26761
39.2425 20.85533 39.0269 19.59211 50.94928 7.91094 54.60908
20.26711 35.3882 22.02911 42.93617 19.48583 41.5524 7.41166
755.5226 79.75042 4.03975 38.33083 3.76071 24.98803]

- TotalsVar(D):

12504.288

+ Part I b)

- Cov(D) Inner:

[[10510.82055 160.50404 9.12961 35.09708 26.99523 -25.22807
17.49392 12.10903 8.43628 7.55082 3.73679 6.4325
73.45068 -265.62508 5.58118 -29.17371 7.93597 -50.36708
2.0676 -21.90276 54.05308 -26.46323 -232.63493 21.89364
0.27855 6.60232 -16.56347]
[160.50404 62.97671 -0.29987 3.37785 -0.09783 1.64663
-1.55046 3.38748 -0.14361 3.95964 -1.15268 10.11162
-3.8195 38.00736 -2.26626 1.42326 -1.10926 0.53545
-2.51958 -0.28879 -3.14046 -0.62104 8.10511 1.17258
1.87549 -1.20906 0.05995]
[9.12961 -0.29987 2.57932 1.04811 2.94723 -0.0164
2.87513 -0.14923 2.8773 0.6823 2.62249 -0.21418
6.40429 -30.7683 2.84205 1.1103 2.59309 -0.05404
2.73336 0.47841 5.83128 -1.78933 -8.26769 -0.34506
-1.44358 3.84865 -0.14441]
[35.09708 3.37785 1.04811 15.83402 2.35463 12.91543
2.02141 10.9388 0.86312 15.20779 1.51054 10.88684
7.66139 30.38292 0.17965 16.30278 -0.23393 15.30422
0.92404 12.6207 7.21011 -8.655 16.25372 1.99884
-0.98827 10.66725 -0.04034]
[26.99523 -0.09783 2.94723 2.35463 4.80889 -1.47799
3.23444 0.8671 3.41388 2.20446 2.91463 0.58551
10.70007 -39.6436 3.07071 2.57056 2.4802 0.78515
2.9845 1.43243 9.23796 -2.15851 -16.5109 0.28217
-1.80329 5.35894 -0.35246]
[-25.22807 1.64663 -0.0164 12.91543 -1.47799 16.56253
1.12108 8.98433 -0.39327 12.74593 0.82883 9.18897
-0.23968 49.43081 -0.44155 14.373 -0.32658 14.45281
0.44721 11.42888 0.7287 -7.69822 35.46989 0.69021
-0.25764 8.5208 0.37018]
[17.49392 -1.55046 2.87513 2.02141 3.23444 1.12108
4.02428 -0.07334 3.49472 1.06889 3.28652 -1.20092
8.39184 -40.47096 3.58665 1.77097 3.12075 0.4656
3.64273 1.12096 7.46052 -2.81986 -8.42103 -0.49553
-2.42068 5.43481 -0.15106]
[12.10903 3.38748 -0.14923 10.9388 0.8671 8.98433
-0.07334 10.59173 -0.93381 12.70116 -0.30053 11.02293
1.52287 52.19885 -1.71732 13.85899 -1.80307 14.09181

-1.28033	11.26167	2.04558	-5.61744	17.27327	2.09952
0.65412	5.65685	-0.02253]			
[8.43628	-0.14361	2.8773	0.86312	3.41388	-0.39327
3.49472	-0.93381	4.17317	-0.43145	3.28513	-1.4097
8.11604	-44.74291	3.78338	0.45473	3.18185	-1.01591
3.66059	-0.21667	7.2069	-1.13807	-11.82892	-0.93009
-2.52429	4.45121	-0.05374]			
[7.55082	3.95964	0.6823	15.20779	2.20446	12.74593
1.06889	12.70116	-0.43145	18.84611	0.7352	13.80942
6.8489	53.03201	-1.20178	19.85464	-1.41871	19.21539
-0.38935	15.43754	6.77011	-8.05444	21.78744	3.19435
0.13499	11.22626	-0.11243]			
[3.73679	-1.15268	2.62249	1.51054	2.91463	0.82883
3.28652	-0.30053	3.28513	0.7352	3.40246	0.5456
7.06788	-36.33471	3.38842	1.40467	2.97669	0.15792
3.38566	0.5537	6.38824	-2.33388	-7.52973	-0.65565
-1.83106	4.55225	-0.14681]			
[6.4325	10.11162	-0.21418	10.88684	0.58551	9.18897
-1.20092	11.02293	-1.4097	13.80942	0.5456	81.39298
-4.3042	74.1322	-2.71871	15.03218	-1.53518	16.95995
-2.51752	10.19461	-2.54853	-7.96566	24.9963	1.8143
-1.39747	2.95833	-1.44596]			
[73.45068	-3.8195	6.40429	7.66139	10.70007	-0.23968
8.39184	1.52287	8.11604	6.8489	7.06788	-4.3042
37.09044	-127.50674	7.9552	7.97569	5.75207	2.34556
8.18604	4.66276	31.56673	-6.38283	-51.64652	2.5256
-5.84071	19.52299	-1.33188]			
[-265.62508	38.00736	-30.7683	30.38292	-39.6436	49.43081
-40.47096	52.19885	-44.74291	53.03201	-36.33471	74.1322
-127.50674	970.26124	-49.55303	56.90487	-40.57204	79.6692
-46.37199	50.6829	-106.2622	-15.16882	333.5266	7.50659
39.9367	-34.02496	5.27014]			
[5.58118	-2.26626	2.84205	0.17965	3.07071	-0.44155
3.58665	-1.71732	3.78338	-1.20178	3.38842	-2.71871
7.9552	-49.55303	4.45185	-0.36631	3.64077	-2.31436
4.01607	-0.6805	7.08255	-1.52566	-12.92838	-0.9614
-2.73961	4.12974	-0.11928]			
[-29.17371	1.42326	1.1103	16.30278	2.57056	14.373
1.77097	13.85899	0.45473	19.85464	1.40467	15.03218
7.97569	56.90487	-0.36631	26.1538	-1.24148	23.6175
0.28905	18.23038	8.00015	-10.05985	28.84444	2.66978
-0.43335	13.76862	0.1349]			
[7.93597	-1.10926	2.59309	-0.23393	2.4802	-0.32658
3.12075	-1.80307	3.18185	-1.41871	2.97669	-1.53518
5.75207	-40.57204	3.64077	-1.24148	3.82637	-2.14125
3.42598	-1.27347	5.23015	-2.35712	-8.75699	-1.04945
-1.38654	3.2148	-0.09103]			
[-50.36708	0.53545	-0.05404	15.30422	0.78515	14.45281
0.4656	14.09181	-1.01591	19.21539	0.15792	16.95995
2.34556	79.6692	-2.31436	23.6175	-2.14125	27.29256

-1.18947	18.56069	3.25402	-8.72032	37.93797	2.59156
2.84534	10.99552	0.33925]			
[2.0676	-2.51958	2.73336	0.92404	2.9845	0.44721
3.64273	-1.28033	3.66059	-0.38935	3.38566	-2.51752
8.18604	-46.37199	4.01607	0.28905	3.42598	-1.18947
4.05886	-0.07262	7.15831	-2.33783	-9.57179	-0.87781
-2.46921	4.91387	-0.03584]			
[-21.90276	-0.28879	0.47841	12.6207	1.43243	11.42888
1.12096	11.26167	-0.21667	15.43754	0.5537	10.19461
4.66276	50.6829	-0.6805	18.23038	-1.27347	18.56069
-0.07262	17.23406	4.92847	-5.64396	22.23059	2.42848
0.42435	9.40883	-0.1778]			
[54.05308	-3.14046	5.83128	7.21011	9.23796	0.7287
7.46052	2.04558	7.2069	6.77011	6.38824	-2.54853
31.56673	-106.2622	7.08255	8.00015	5.23015	3.25402
7.15831	4.92847	28.2734	-5.63596	-45.49427	2.51463
-4.85198	17.63454	-1.17289]			
[-26.46323	-0.62104	-1.78933	-8.655	-2.15851	-7.69822
-2.81986	-5.61744	-1.13807	-8.05444	-2.33388	-7.96566
-6.38283	-15.16882	-1.52566	-10.05985	-2.35712	-8.72032
-2.33783	-5.64396	-5.63596	54.74895	-10.1452	-4.26272
3.51828	-7.57593	0.07503]			
[-232.63493	8.10511	-8.26769	16.25372	-16.5109	35.46989
-8.42103	17.27327	-11.82892	21.78744	-7.52973	24.9963
-51.64652	333.5266	-12.92838	28.84444	-8.75699	37.93797
-9.57179	22.23059	-45.49427	-10.1452	222.03116	-6.44496
14.60883	2.28166	4.41528]			
[21.89364	1.17258	-0.34506	1.99884	0.28217	0.69021
-0.49553	2.09952	-0.93009	3.19435	-0.65565	1.8143
2.5256	7.50659	-0.9614	2.66978	-1.04945	2.59156
-0.87781	2.42848	2.51463	-4.26272	-6.44496	6.00818
-0.21728	1.29518	-0.40301]			
[0.27855	1.87549	-1.44358	-0.98827	-1.80329	-0.25764
-2.42068	0.65412	-2.52429	0.13499	-1.83106	-1.39747
-5.84071	39.9367	-2.73961	-0.43335	-1.38654	2.84534
-2.46921	0.42435	-4.85198	3.51828	14.60883	-0.21728
139.10834	-2.08723	-1.0068]			
[6.60232	-1.20906	3.84865	10.66725	5.35894	8.5208
5.43481	5.65685	4.45121	11.22626	4.55225	2.95833
19.52299	-34.02496	4.12974	13.76862	3.2148	10.99552
4.91387	9.40883	17.63454	-7.57593	2.28166	1.29518
-2.08723	17.59418	-0.23973]			
[-16.56347	0.05995	-0.14441	-0.04034	-0.35246	0.37018
-0.15106	-0.02253	-0.05374	-0.11243	-0.14681	-1.44596
-1.33188	5.27014	-0.11928	0.1349	-0.09103	0.33925
-0.03584	-0.1778	-1.17289	0.07503	4.41528	-0.40301
-1.0068	-0.23973	210.14174]]			

- Cov(D) Outer:

[[10510.82055 160.50404 9.12961 35.09708 26.99523 -25.22807

	17.49392	12.10903	8.43628	7.55082	3.73679	6.4325
	73.45068	-265.62508	5.58118	-29.17371	7.93597	-50.36708
	2.0676	-21.90276	54.05308	-26.46323	-232.63493	21.89364
	0.27855	6.60232	-16.56347]			
[	160.50404	62.97671	-0.29987	3.37785	-0.09783	1.64663
	-1.55046	3.38748	-0.14361	3.95964	-1.15268	10.11162
	-3.8195	38.00736	-2.26626	1.42326	-1.10926	0.53545
	-2.51958	-0.28879	-3.14046	-0.62104	8.10511	1.17258
	1.87549	-1.20906	0.05995]			
[	9.12961	-0.29987	2.57932	1.04811	2.94723	-0.0164
	2.87513	-0.14923	2.8773	0.6823	2.62249	-0.21418
	6.40429	-30.7683	2.84205	1.1103	2.59309	-0.05404
	2.73336	0.47841	5.83128	-1.78933	-8.26769	-0.34506
	-1.44358	3.84865	-0.14441]			
[	35.09708	3.37785	1.04811	15.83402	2.35463	12.91543
	2.02141	10.9388	0.86312	15.20779	1.51054	10.88684
	7.66139	30.38292	0.17965	16.30278	-0.23393	15.30422
	0.92404	12.6207	7.21011	-8.655	16.25372	1.99884
	-0.98827	10.66725	-0.04034]			
[	26.99523	-0.09783	2.94723	2.35463	4.80889	-1.47799
	3.23444	0.8671	3.41388	2.20446	2.91463	0.58551
	10.70007	-39.6436	3.07071	2.57056	2.4802	0.78515
	2.9845	1.43243	9.23796	-2.15851	-16.5109	0.28217
	-1.80329	5.35894	-0.35246]			
[	-25.22807	1.64663	-0.0164	12.91543	-1.47799	16.56253
	1.12108	8.98433	-0.39327	12.74593	0.82883	9.18897
	-0.23968	49.43081	-0.44155	14.373	-0.32658	14.45281
	0.44721	11.42888	0.7287	-7.69822	35.46989	0.69021
	-0.25764	8.5208	0.37018]			
[	17.49392	-1.55046	2.87513	2.02141	3.23444	1.12108
	4.02428	-0.07334	3.49472	1.06889	3.28652	-1.20092
	8.39184	-40.47096	3.58665	1.77097	3.12075	0.4656
	3.64273	1.12096	7.46052	-2.81986	-8.42103	-0.49553
	-2.42068	5.43481	-0.15106]			
[	12.10903	3.38748	-0.14923	10.9388	0.8671	8.98433
	-0.07334	10.59173	-0.93381	12.70116	-0.30053	11.02293
	1.52287	52.19885	-1.71732	13.85899	-1.80307	14.09181
	-1.28033	11.26167	2.04558	-5.61744	17.27327	2.09952
	0.65412	5.65685	-0.02253]			
[	8.43628	-0.14361	2.8773	0.86312	3.41388	-0.39327
	3.49472	-0.93381	4.17317	-0.43145	3.28513	-1.4097
	8.11604	-44.74291	3.78338	0.45473	3.18185	-1.01591
	3.66059	-0.21667	7.2069	-1.13807	-11.82892	-0.93009
	-2.52429	4.45121	-0.05374]			
[	7.55082	3.95964	0.6823	15.20779	2.20446	12.74593
	1.06889	12.70116	-0.43145	18.84611	0.7352	13.80942
	6.8489	53.03201	-1.20178	19.85464	-1.41871	19.21539
	-0.38935	15.43754	6.77011	-8.05444	21.78744	3.19435
	0.13499	11.22626	-0.11243]			
[	3.73679	-1.15268	2.62249	1.51054	2.91463	0.82883

	3.28652	-0.30053	3.28513	0.7352	3.40246	0.5456
	7.06788	-36.33471	3.38842	1.40467	2.97669	0.15792
	3.38566	0.5537	6.38824	-2.33388	-7.52973	-0.65565
	-1.83106	4.55225	-0.14681]			
[	6.4325	10.11162	-0.21418	10.88684	0.58551	9.18897
	-1.20092	11.02293	-1.4097	13.80942	0.5456	81.39298
	-4.3042	74.1322	-2.71871	15.03218	-1.53518	16.95995
	-2.51752	10.19461	-2.54853	-7.96566	24.9963	1.8143
	-1.39747	2.95833	-1.44596]			
[	73.45068	-3.8195	6.40429	7.66139	10.70007	-0.23968
	8.39184	1.52287	8.11604	6.8489	7.06788	-4.3042
	37.09044	-127.50674	7.9552	7.97569	5.75207	2.34556
	8.18604	4.66276	31.56673	-6.38283	-51.64652	2.5256
	-5.84071	19.52299	-1.33188]			
[	-265.62508	38.00736	-30.7683	30.38292	-39.6436	49.43081
	-40.47096	52.19885	-44.74291	53.03201	-36.33471	74.1322
	-127.50674	970.26124	-49.55303	56.90487	-40.57204	79.6692
	-46.37199	50.6829	-106.2622	-15.16882	333.5266	7.50659
	39.9367	-34.02496	5.27014]			
[	5.58118	-2.26626	2.84205	0.17965	3.07071	-0.44155
	3.58665	-1.71732	3.78338	-1.20178	3.38842	-2.71871
	7.9552	-49.55303	4.45185	-0.36631	3.64077	-2.31436
	4.01607	-0.6805	7.08255	-1.52566	-12.92838	-0.9614
	-2.73961	4.12974	-0.11928]			
[	-29.17371	1.42326	1.1103	16.30278	2.57056	14.373
	1.77097	13.85899	0.45473	19.85464	1.40467	15.03218
	7.97569	56.90487	-0.36631	26.1538	-1.24148	23.6175
	0.28905	18.23038	8.00015	-10.05985	28.84444	2.66978
	-0.43335	13.76862	0.1349]			
[	7.93597	-1.10926	2.59309	-0.23393	2.4802	-0.32658
	3.12075	-1.80307	3.18185	-1.41871	2.97669	-1.53518
	5.75207	-40.57204	3.64077	-1.24148	3.82637	-2.14125
	3.42598	-1.27347	5.23015	-2.35712	-8.75699	-1.04945
	-1.38654	3.2148	-0.09103]			
[	-50.36708	0.53545	-0.05404	15.30422	0.78515	14.45281
	0.4656	14.09181	-1.01591	19.21539	0.15792	16.95995
	2.34556	79.6692	-2.31436	23.6175	-2.14125	27.29256
	-1.18947	18.56069	3.25402	-8.72032	37.93797	2.59156
	2.84534	10.99552	0.33925]			
[	2.0676	-2.51958	2.73336	0.92404	2.9845	0.44721
	3.64273	-1.28033	3.66059	-0.38935	3.38566	-2.51752
	8.18604	-46.37199	4.01607	0.28905	3.42598	-1.18947
	4.05886	-0.07262	7.15831	-2.33783	-9.57179	-0.87781
	-2.46921	4.91387	-0.03584]			
[	-21.90276	-0.28879	0.47841	12.6207	1.43243	11.42888
	1.12096	11.26167	-0.21667	15.43754	0.5537	10.19461
	4.66276	50.6829	-0.6805	18.23038	-1.27347	18.56069
	-0.07262	17.23406	4.92847	-5.64396	22.23059	2.42848
	0.42435	9.40883	-0.1778]			
[	54.05308	-3.14046	5.83128	7.21011	9.23796	0.7287

7.46052	2.04558	7.2069	6.77011	6.38824	-2.54853
31.56673	-106.2622	7.08255	8.00015	5.23015	3.25402
7.15831	4.92847	28.2734	-5.63596	-45.49427	2.51463
-4.85198	17.63454	-1.17289]			
[-26.46323	-0.62104	-1.78933	-8.655	-2.15851	-7.69822
-2.81986	-5.61744	-1.13807	-8.05444	-2.33388	-7.96566
-6.38283	-15.16882	-1.52566	-10.05985	-2.35712	-8.72032
-2.33783	-5.64396	-5.63596	54.74895	-10.1452	-4.26272
3.51828	-7.57593	0.07503]			
[-232.63493	8.10511	-8.26769	16.25372	-16.5109	35.46989
-8.42103	17.27327	-11.82892	21.78744	-7.52973	24.9963
-51.64652	333.5266	-12.92838	28.84444	-8.75699	37.93797
-9.57179	22.23059	-45.49427	-10.1452	222.03116	-6.44496
14.60883	2.28166	4.41528]			
[21.89364	1.17258	-0.34506	1.99884	0.28217	0.69021
-0.49553	2.09952	-0.93009	3.19435	-0.65565	1.8143
2.5256	7.50659	-0.9614	2.66978	-1.04945	2.59156
-0.87781	2.42848	2.51463	-4.26272	-6.44496	6.00818
-0.21728	1.29518	-0.40301]			
[0.27855	1.87549	-1.44358	-0.98827	-1.80329	-0.25764
-2.42068	0.65412	-2.52429	0.13499	-1.83106	-1.39747
-5.84071	39.9367	-2.73961	-0.43335	-1.38654	2.84534
-2.46921	0.42435	-4.85198	3.51828	14.60883	-0.21728
139.10834	-2.08723	-1.0068]			
[6.60232	-1.20906	3.84865	10.66725	5.35894	8.5208
5.43481	5.65685	4.45121	11.22626	4.55225	2.95833
19.52299	-34.02496	4.12974	13.76862	3.2148	10.99552
4.91387	9.40883	17.63454	-7.57593	2.28166	1.29518
-2.08723	17.59418	-0.23973]			
[-16.56347	0.05995	-0.14441	-0.04034	-0.35246	0.37018
-0.15106	-0.02253	-0.05374	-0.11243	-0.14681	-1.44596
-1.33188	5.27014	-0.11928	0.1349	-0.09103	0.33925
-0.03584	-0.1778	-1.17289	0.07503	4.41528	-0.40301
-1.0068	-0.23973	210.14174]]			

+ Part I c)

- Corr(D):

[[1.	0.19728	0.05545	0.08603	0.12007	-0.06046	0.08506	0.03629
0.04028	0.01697	0.01976	0.00695	0.11764	-0.08318	0.0258	-0.05564
0.03957	-0.09404	0.01001	-0.05146	0.09915	-0.03488	-0.15228	0.08712
0.00023	0.01535	-0.01114]					
[0.19728	1.	-0.02353	0.10697	-0.00562	0.05099	-0.09739	0.13116
-0.00886	0.11494	-0.07874	0.14123	-0.07903	0.15376	-0.13535	0.03507
-0.07146	0.01292	-0.15759	-0.00877	-0.07442	-0.01058	0.06854	0.06028
0.02004	-0.03632	0.00052]					
[0.05545	-0.02353	1.	0.16401	0.83683	-0.00251	0.8924	-0.02855
0.877	0.09786	0.88525	-0.01478	0.65477	-0.61504	0.83871	0.13518
0.82541	-0.00644	0.84478	0.07176	0.68285	-0.15057	-0.34548	-0.08765
-0.07621	0.57131	-0.0062]					
[0.08603	0.10697	0.16401	1.	0.26984	0.79754	0.25323	0.84468

0.10618 0.88036 0.2058 0.30326 0.31614 0.24513 0.0214 0.80112
-0.03005 0.7362 0.11526 0.764 0.34077 -0.29396 0.27413 0.20493
-0.02106 0.63911 -0.0007]
[0.12007 -0.00562 0.83683 0.26984 1. -0.16561 0.73525 0.1215
0.76207 0.23156 0.72055 0.0296 0.80119 -0.58037 0.66366 0.22921
0.57819 0.06853 0.67553 0.15735 0.79225 -0.13303 -0.50529 0.0525
-0.06972 0.5826 -0.01109]
[-0.06046 0.05099 -0.00251 0.79754 -0.16561 1. 0.13732 0.67833
-0.0473 0.72144 0.11041 0.25027 -0.00967 0.38993 -0.05142 0.69058
-0.04102 0.67978 0.05454 0.67647 0.03367 -0.25565 0.58491 0.06919
-0.00537 0.49915 0.00627]
[0.08506 -0.09739 0.8924 0.25323 0.73525 0.13732 1. -0.01123
0.85278 0.12274 0.88817 -0.06636 0.68688 -0.64767 0.84737 0.17262
0.79528 0.04443 0.90132 0.1346 0.69942 -0.18997 -0.28172 -0.10078
-0.10231 0.64589 -0.00519]
[0.03629 0.13116 -0.02855 0.84468 0.1215 0.67833 -0.01123 1.
-0.14046 0.89898 -0.05006 0.37542 0.07683 0.51491 -0.25009 0.83268
-0.28323 0.82882 -0.19527 0.83354 0.11821 -0.23327 0.35619 0.26319
0.01704 0.41439 -0.00048]
[0.04028 -0.00886 0.877 0.10618 0.76207 -0.0473 0.85278 -0.14046
1. -0.04865 0.87181 -0.07649 0.65235 -0.70315 0.87776 0.04353
0.79626 -0.09519 0.88944 -0.02555 0.66348 -0.07529 -0.3886 -0.18575
-0.10477 0.51947 -0.00181]
[0.01697 0.11494 0.09786 0.88036 0.23156 0.72144 0.12274 0.89898
-0.04865 1. 0.09181 0.35259 0.25905 0.39218 -0.1312 0.8943
-0.16707 0.84726 -0.04452 0.85659 0.29329 -0.25075 0.33681 0.30019
0.00264 0.61651 -0.00179]
[0.01976 -0.07874 0.88525 0.2058 0.72055 0.11041 0.88817 -0.05006
0.87181 0.09181 1. 0.03279 0.62916 -0.63238 0.87062 0.14891
0.82498 0.01639 0.91106 0.07231 0.65132 -0.171 -0.27395 -0.14501
-0.08416 0.58836 -0.00549]
[0.00695 0.14123 -0.01478 0.30326 0.0296 0.25027 -0.06636 0.37542
-0.07649 0.35259 0.03279 1. -0.07834 0.2638 -0.14282 0.32581
-0.08699 0.35984 -0.13851 0.2722 -0.05313 -0.11933 0.18594 0.08204
-0.01313 0.07818 -0.01106]
[0.11764 -0.07903 0.65477 0.31614 0.80119 -0.00967 0.68688 0.07683
0.65235 0.25905 0.62916 -0.07834 1. -0.67214 0.61908 0.25608
0.48284 0.07372 0.66718 0.18442 0.97479 -0.14164 -0.56912 0.16919
-0.08131 0.76424 -0.01509]
[-0.08318 0.15376 -0.61504 0.24513 -0.58037 0.38993 -0.64767 0.51491
-0.70315 0.39218 -0.63238 0.2638 -0.67214 1. -0.75397 0.35722
-0.66587 0.48958 -0.73894 0.39194 -0.64157 -0.06581 0.71859 0.09832
0.10871 -0.26042 0.01167]
[0.0258 -0.13535 0.83871 0.0214 0.66366 -0.05142 0.84737 -0.25009
0.87776 -0.1312 0.87062 -0.14282 0.61908 -0.75397 1. -0.03395
0.88212 -0.20996 0.94478 -0.07769 0.63129 -0.09772 -0.41121 -0.18589
-0.11009 0.46662 -0.0039]
[-0.05564 0.03507 0.13518 0.80112 0.22921 0.69058 0.17262 0.83268
0.04353 0.8943 0.14891 0.32581 0.25608 0.35722 -0.03395 1.
-0.1241 0.88398 0.02805 0.85869 0.2942 -0.26585 0.37852 0.21298

```

-0.00718 0.64186 0.00182]
[ 0.03957 -0.07146 0.82541 -0.03005 0.57819 -0.04102 0.79528 -0.28323
 0.79626 -0.16707 0.82498 -0.08699 0.48284 -0.66587 0.88212 -0.1241
 1.    -0.20953 0.86934 -0.15682 0.50284 -0.16285 -0.30044 -0.21888
-0.0601 0.39181 -0.00321]
[-0.09404 0.01292 -0.00644 0.7362 0.06853 0.67978 0.04443 0.82882
-0.09519 0.84726 0.01639 0.35984 0.07372 0.48958 -0.20996 0.88398
-0.20953 1.    -0.11301 0.85581 0.11714 -0.22559 0.48735 0.20238
0.04618 0.50177 0.00448]
[ 0.01001 -0.15759 0.84478 0.11526 0.67553 0.05454 0.90132 -0.19527
0.88944 -0.04452 0.91106 -0.13851 0.66718 -0.73894 0.94478 0.02805
0.86934 -0.11301 1.    -0.00868 0.66822 -0.15683 -0.31885 -0.17776
-0.10392 0.58148 -0.00123]
[-0.05146 -0.00877 0.07176 0.764 0.15735 0.67647 0.1346 0.83354
-0.02555 0.85659 0.07231 0.2722 0.18442 0.39194 -0.07769 0.85869
-0.15682 0.85581 -0.00868 1.    0.22327 -0.18374 0.35938 0.23865
0.00867 0.54033 -0.00295]
[ 0.09915 -0.07442 0.68285 0.34077 0.79225 0.03367 0.69942 0.11821
0.66348 0.29329 0.65132 -0.05313 0.97479 -0.64157 0.63129 0.2942
0.50284 0.11714 0.66822 0.22327 1.    -0.14325 -0.5742 0.19294
-0.07737 0.79066 -0.01522]
[-0.03488 -0.01058 -0.15057 -0.29396 -0.13303 -0.25565 -0.18997 -0.23327
-0.07529 -0.25075 -0.171 -0.11933 -0.14164 -0.06581 -0.09772 -0.26585
-0.16285 -0.22559 -0.15683 -0.18374 -0.14325 1.    -0.09202 -0.23503
0.04031 -0.2441 0.0007 ]
[-0.15228 0.06854 -0.34548 0.27413 -0.50529 0.58491 -0.28172 0.35619
-0.3886 0.33681 -0.27395 0.18594 -0.56912 0.71859 -0.41121 0.37852
-0.30044 0.48735 -0.31885 0.35938 -0.5742 -0.09202 1.    -0.17646
0.08313 0.03651 0.02044]
[ 0.08712 0.06028 -0.08765 0.20493 0.0525 0.06919 -0.10078 0.26319
-0.18575 0.30019 -0.14501 0.08204 0.16919 0.09832 -0.18589 0.21298
-0.21888 0.20238 -0.17776 0.23865 0.19294 -0.23503 -0.17646 1.
-0.00752 0.12597 -0.01134]
[ 0.00023 0.02004 -0.07621 -0.02106 -0.06972 -0.00537 -0.10231 0.01704
-0.10477 0.00264 -0.08416 -0.01313 -0.08131 0.10871 -0.11009 -0.00718
-0.0601 0.04618 -0.10392 0.00867 -0.07737 0.04031 0.08313 -0.00752
1.    -0.04219 -0.00589]
[ 0.01535 -0.03632 0.57131 0.63911 0.5826 0.49915 0.64589 0.41439
0.51947 0.61651 0.58836 0.07818 0.76424 -0.26042 0.46662 0.64186
0.39181 0.50177 0.58148 0.54033 0.79066 -0.2441 0.03651 0.12597
-0.04219 1.    -0.00394]
[-0.01114 0.00052 -0.0062 -0.0007 -0.01109 0.00627 -0.00519 -0.00048
-0.00181 -0.00179 -0.00549 -0.01106 -0.01509 0.01167 -0.0039 0.00182
-0.00321 0.00448 -0.00123 -0.00295 -0.01522 0.0007 0.02044 -0.01134
-0.00589 -0.00394 1.    ]]

```

+ Part II

- Dominant eigen vector and eigen value

ltr: 1 - Eigen Val: 10302.211;

Eigen Vec [1. 0.02707 0.00069 0.02151 0.00264 0.0159 0.00155 0.01741
-0.00081 0.02285 0.00024 0.02551 0.0055 0.09356 -0.00251 0.02266
-0.00174 0.0219 -0.00172 0.01777 0.00519 -0.00939 0.0349 0.00428
0.01647 0.01251 0.01914];

Error: 5.03

Itr: 2 - Eigen Val: 10481.806;

Eigen Vec [1. 0.01589 0.00058 0.00393 0.0022 -0.00163 0.0013 0.00189
0.00037 0.00156 0.00003 0.00176 0.00579 -0.01464 0.00003 -0.00185
0.00035 -0.00364 -0.00025 -0.00131 0.00416 -0.00288 -0.01806 0.00218
0.00064 0.00052 -0.00114];

Error: 0.14

Itr: 3 - Eigen Val: 10522.842;

Eigen Vec [1. 0.01528 0.00093 0.00328 0.00266 -0.00252 0.00174 0.00106
0.00089 0.00062 0.00043 0.00049 0.00728 -0.02724 0.00063 -0.00289
0.00083 -0.00496 0.00028 -0.00219 0.00539 -0.0025 -0.023 0.00209
-0.00005 0.00069 -0.00161];

Error: 0.01

Itr: 4 - Eigen Val: 10527.541;

Eigen Vec [1. 0.01522 0.00097 0.00323 0.00272 -0.00261 0.0018 0.00098
0.00096 0.00054 0.00047 0.00037 0.00746 -0.02864 0.0007 -0.00298
0.00089 -0.00508 0.00035 -0.00227 0.00555 -0.00247 -0.02353 0.00208
-0.00012 0.00073 -0.00163];

Error: 0.00

Itr: 5 - Eigen Val: 10528.062;

Eigen Vec [1. 0.01521 0.00098 0.00322 0.00273 -0.00262 0.0018 0.00097
0.00096 0.00053 0.00048 0.00036 0.00749 -0.0288 0.0007 -0.00299
0.00089 -0.0051 0.00035 -0.00227 0.00556 -0.00247 -0.02359 0.00208
-0.00012 0.00073 -0.00163];

Error: 0.00

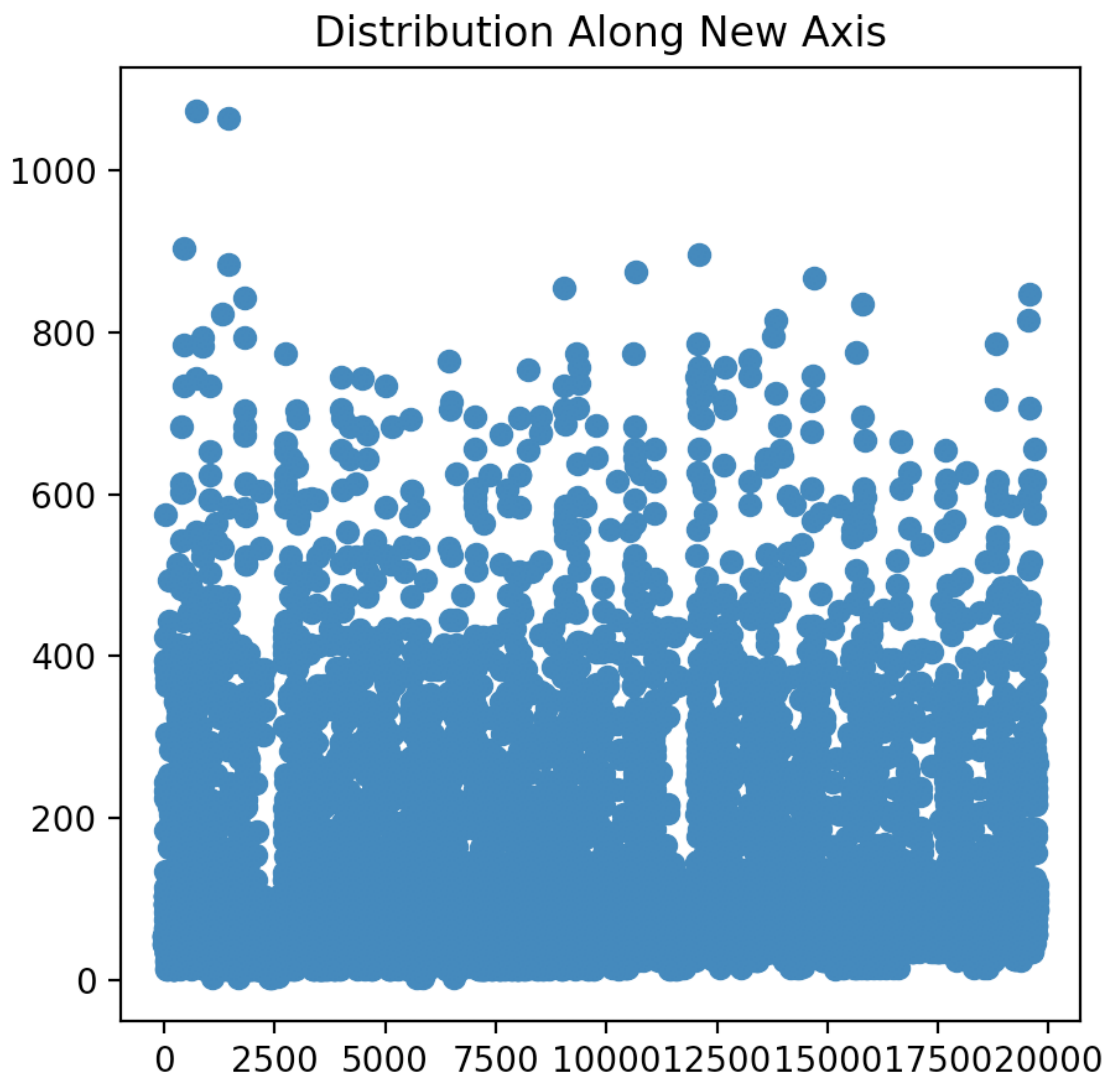
Itr: 6 - Eigen Val: 10528.119;

Eigen Vec [1. 0.01521 0.00098 0.00322 0.00273 -0.00262 0.0018 0.00097
0.00096 0.00053 0.00048 0.00036 0.00749 -0.02881 0.00071 -0.00299
0.00089 -0.0051 0.00035 -0.00228 0.00557 -0.00247 -0.0236 0.00208
-0.00013 0.00073 -0.00163];

Error: 0.00

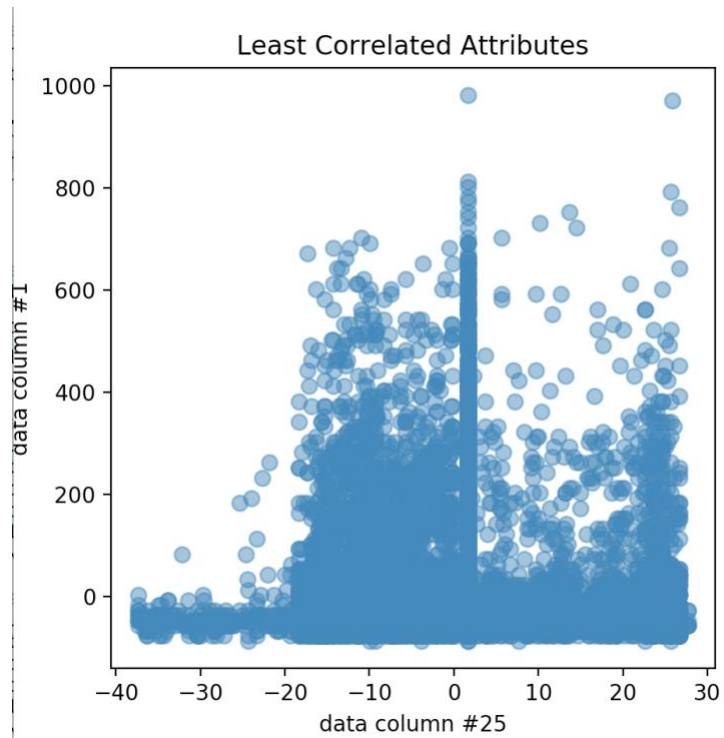
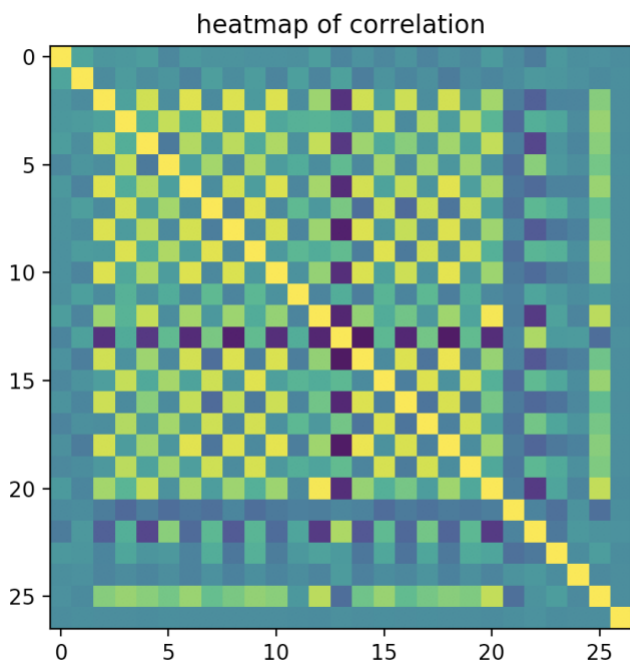
At Itr6, it is the final dominant eigenvector and eigenvalue.

Projections on original data

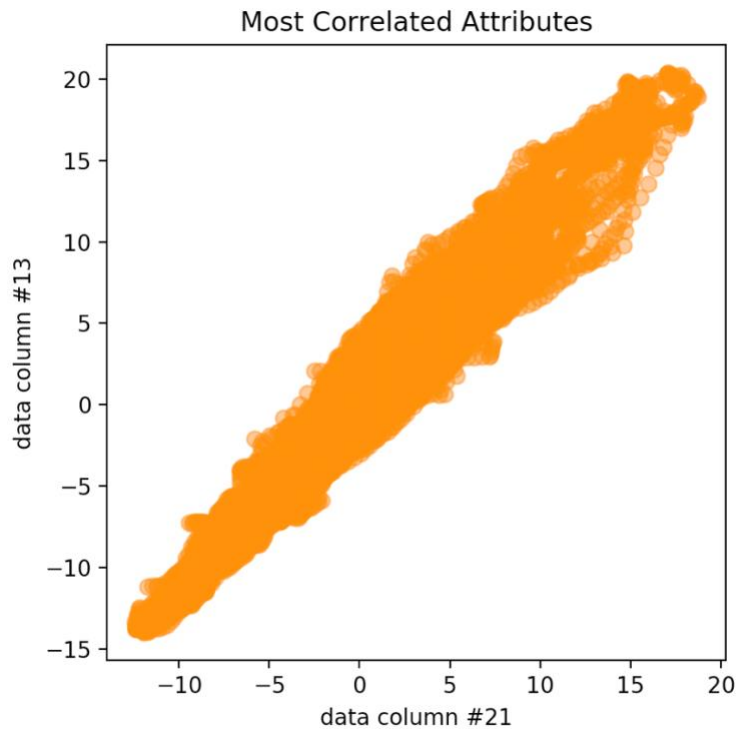


CORRELATION Matrix

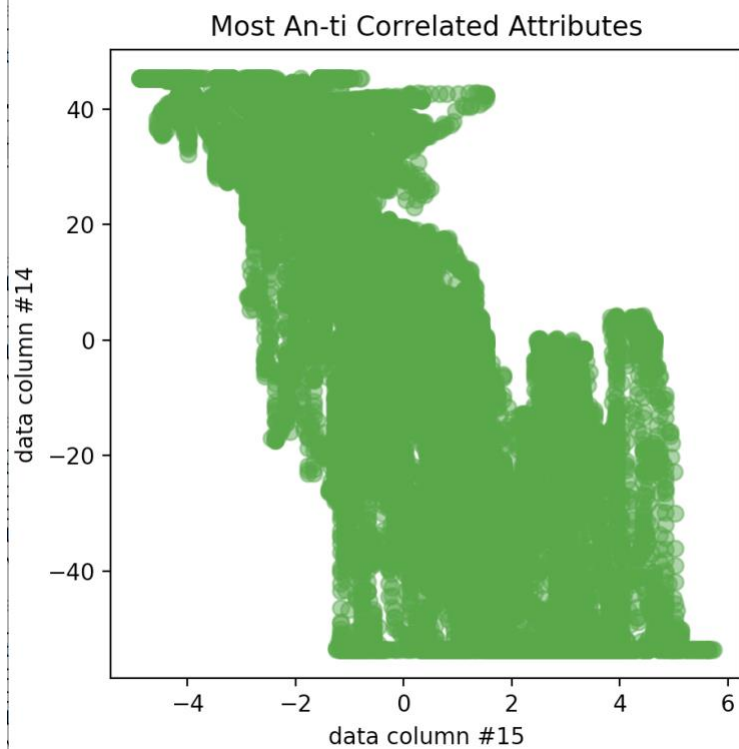
1	[	1.	0.1973	0.0554	0.086	0.1201	-0.0605	0.0851	0.0363	0.0403	0.017	0.0198	0.007	0.1176	-0.0832
2	[	0.1973	1.	-0.0235	0.107	-0.0056	0.051	-0.0974	0.1312	-0.0089	0.1149	-0.0787	0.1412	-0.079	0.1538
3	[	0.0554	-0.0235	1.	0.164	0.8368	-0.0025	0.8924	-0.0286	0.877	0.0979	*0.8852	-0.0148	0.6548	-0.615
4	[	0.086	0.107	0.164	1.	0.2698	0.7975	0.2532	0.8447	0.1062	0.8804	0.2058	0.3033	0.3161	0.2451
5	[	0.1201	-0.0056	0.8368	0.2698	1.	-0.1656	0.7352	0.1215	0.7621	0.2316	0.7206	0.0296	0.8012	-0.5804
6	[	-0.0605	0.051	-0.0025	0.7975	-0.1656	1.	0.1373	0.6783	-0.0473	0.7214	0.1104	0.2503	-0.0097	0.3899
7	[	0.0851	-0.0974	0.8924	0.2532	0.7352	0.1373	1.	-0.0112	0.8528	0.1227	*0.8882	-0.0664	0.6869	-0.6477
8	[	0.0363	0.1312	-0.0286	0.8447	0.1215	0.6783	-0.0112	1.	-0.1405	*0.899*	-0.0501	0.3754	0.0768	0.5149
9	[	0.0403	-0.0089	0.877	0.1062	0.7621	-0.0473	0.8528	-0.1405	1.	-0.0487	0.8718	-0.0765	0.6523	-0.7031
0	[	0.017	0.1149	0.0979	0.8804	0.2316	0.7214	0.1227	0.899	-0.0487	1.	0.0918	0.3526	0.259	0.3922
1	[	0.0198	-0.0787	0.8852	0.2058	0.7206	0.1104	0.8882	-0.0501	0.8718	0.0918	1.	0.0328	0.6292	-0.6324
2	[	0.007	0.1412	-0.0148	0.3033	0.0296	0.2503	-0.0664	0.3754	-0.0765	0.3526	0.0328	1.	-0.0783	0.2638
3	[	0.1176	-0.079	0.6548	0.3161	0.8012	-0.0097	0.6869	0.0768	0.6523	0.259	0.6292	-0.0783	1.	-0.6721
4	[	-0.0832	0.1538	-0.615	0.2451	-0.5804	0.3899	-0.6477	0.5149	-0.7031	0.3922	-0.6324	0.2638	-0.6721	1.
5	[	0.0258	-0.1353	0.8387	0.0214	0.6637	-0.0514	0.8474	-0.2501	0.8778	-0.1312	0.8706	-0.1428	0.6191	-0.754
6	[	-0.0556	0.0351	0.1352	0.8011	0.2292	0.6906	0.1726	0.8327	0.0435	0.8943	0.1489	0.3258	0.2561	0.3572
7	[	0.0396	-0.0715	0.8254	-0.0301	0.5782	-0.041	0.7953	-0.2832	0.7963	-0.1671	0.825	-0.087	0.4828	-0.6659
8	[	-0.0094	0.0129	-0.0064	0.7362	0.0685	0.6798	0.0444	0.8288	-0.0952	0.8473	0.0164	0.3598	0.0737	0.4896
9	[	0.01	-0.1576	0.8448	0.1153	0.6755	0.0545	0.9013	-0.1953	0.8894	-0.0445	0.9111	-0.1385	0.6672	-0.7389
0	[	-0.0515	-0.0088	0.0718	0.764	0.1573	0.6765	0.1346	0.8335	-0.0255	0.8566	0.0723	0.2722	0.1844	0.3919
1	[	0.0992	-0.0744	0.6828	0.3408	0.7923	0.0337	0.6994	0.1182	0.6635	0.2933	0.6513	-0.0531	0.9748	-0.6416
2	[	-0.0349	0.0106	-0.1506	-0.294	-0.133	-0.2556	-0.19	-0.2333	-0.0753	-0.2507	-0.171	-0.1193	-0.1416	-0.0658
3	[	-0.1523	0.0685	-0.3455	0.2741	-0.5053	0.5849	-0.2817	0.3562	-0.3886	0.3368	-0.274	0.1859	-0.5691	0.7186
4	[	0.0871	0.0603	-0.0877	0.2049	0.0525	0.0692	-0.1008	0.2632	-0.1857	0.3002	-0.145	0.082	0.1692	0.0983
5	[	0.0002	0.02	-0.0762	-0.0211	-0.0697	-0.0054	-0.1023	0.017	-0.1048	0.0026	-0.0842	-0.0131	-0.0813	0.1087
6	[	0.0154	-0.0363	0.5713	0.6391	0.5826	0.4992	0.6459	0.4144	0.5195	0.6165	0.5884	0.0782	0.7642	-0.2604
7	[	-0.0111	0.0005	-0.0062	-0.0007	-0.0111	0.0063	-0.0052	-0.0005	-0.0018	-0.0018	-0.0055	-0.0111	-0.0151	0.0117
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		0.0258	-0.0556	0.0396	-0.094	0.01	-0.0515	0.0992	-0.0349	-0.1523	0.0871	0.0002	0.0154	-0.0111]	
		-0.1353	0.0351	-0.0715	0.0129	-0.1576	-0.0088	-0.0744	-0.0106	0.0685	0.0603	0.02	-0.0363	0.0005]	
		0.8387	0.1352	0.8254	-0.0064	0.8448	0.0718	0.6828	-0.1506	-0.3455	-0.0877	-0.0762	0.5713	-0.0062]	
		0.0214	0.8011	-0.0301	0.7362	0.1153	0.764	0.3408	-0.294	0.2741	0.2049	-0.0211	0.6391	-0.0007]	
		0.6637	0.2292	0.5782	0.0685	0.6755	0.1573	0.7923	-0.133	-0.5053	0.0525	-0.0697	0.5826	-0.0111]	6
		-0.0514	0.6906	-0.041	0.6798	0.0545	0.6765	0.0337	-0.2556	0.5849	0.0692	-0.0054	0.4992	0.0063]	
		0.8474	0.1726	0.7953	0.0444	0.9013	0.1346	0.6994	-0.19	-0.2817	-0.1008	-0.1023	0.6459	-0.0052]	
		-0.2501	0.8327	-0.2832	0.8288	-0.1953	0.8335	0.1182	-0.2333	0.3562	0.2632	0.017	0.4144	-0.0005]	
		0.8778	0.0435	0.7963	-0.0952	*0.8894	-0.0255	0.6635	-0.0753	-0.3886	-0.1857	-0.1048	0.5195	-0.0018]	
		-0.1312	0.8943	-0.1671	0.8473	-0.0445	0.8566	0.2933	-0.2507	0.3368	0.3002	0.0026	0.6165	-0.0018]	
		0.8706	0.1489	0.825	0.0164	0.9111	0.0723	0.6513	-0.171	-0.274	-0.145	-0.0842	0.5884	-0.0055]	
		-0.1428	0.3258	-0.087	0.3598	-0.1385	0.2722	-0.0531	-0.1193	0.1859	0.082	-0.0131	0.0782	-0.0111]	
		0.6191	0.2561	0.4828	0.0737	0.6672	0.1844	(0.9748)	-0.1416	-0.5691	0.1692	-0.0813	0.7642	-0.0151]	
		-0.754	0.3572	-0.6659	0.4896	-0.7389	0.3919	-0.6416	-0.0658	0.7186	0.0983	0.1087	-0.2604	0.0117]	
		1.	-0.0339	0.8821	-0.21	0.9448	-0.0777	0.6313	-0.0977	-0.4112	-0.1859	-0.1101	0.4666	-0.0039]	
		-0.0339	1.	-0.1241	0.884	0.0281	0.8587	0.2942	-0.2658	0.3785	0.213	-0.0072	0.6419	0.0018]	
		0.8821	-0.1241	1.	-0.2095	0.8693	-0.1568	0.5028	-0.1629	-0.3004	-0.2189	-0.0601	0.3918	-0.0032]	
		-0.21	0.884	-0.2095	1.	-0.113	0.8558	0.1171	-0.2256	0.4874	0.2024	0.0462	0.5018	0.0045]	
		0.9448	0.0281	0.8693	-0.113	1.	-0.0087	0.6682	-0.1568	-0.3188	-0.1778	-0.1039	0.5815	-0.0012]	
		-0.0777	0.8587	-0.1568	0.8558	-0.0087	1.	0.2233	-0.1837	0.3594	0.2387	0.0087	0.5403	-0.003]	
		0.6313	0.2942	0.5028	0.1171	0.6682	0.2233	1.	-0.1432	-0.5742	0.1929	-0.0774	0.7907	-0.0152]	
		-0.0977	-0.2658	-0.1629	-0.2256	-0.1568	-0.1837	-0.1432	1.	-0.092	-0.235	0.0403	-0.2441	0.0007]	
		-0.4112	0.3785	-0.3004	0.4874	-0.3188	0.3594	-0.5742	-0.092	1.	-0.1765	0.0831	0.0365	0.0204]	
		-0.1859	0.213	-0.2189	0.2024	-0.1778	0.2387	0.1929	-0.235	-0.1765	1.	-0.0075	0.126	-0.0113]	
		-0.1101	-0.0072	-0.0601	0.0462	-0.1039	0.0087	-0.0774	0.0403	0.0831	-0.0075	1.	-0.0422	-0.0059]	
		0.4666	0.6419	0.3918	0.5018	0.5815	0.5403	0.7907	-0.2441	0.0365	0.126	-0.0422	1.	-0.0039]	
		-0.0039	0.0018	-0.0032	0.0045	-0.0012	-0.003	-0.0152	0.0007	0.0204	-0.0113	-0.0059	-0.0039	1.]]
		15	16	17	18	19	20	21	22	23	24	25	26	27	



The least related data column 25 and 1 --- Visibility and Appliances --- -0.0002
 We can see the points are scattering around, without a particular pattern



The most related data column 21 and 13 --- T1 and RH_out --- 0.9748
 We can see the data has a strong positive relation, in which they are very close together



The most anti-related data column 15 and 14 --- RH_6 and T7 --- -0.754
 We can see the data has a strong positive relation, in which they are very close together in the negative relation.