pre (mostly useless unless you need to import)

```
StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
 "\\C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[12], ".txt" ]
```

```
C:\Users\George\Documents\SVD DNA
  stuff\CombinedPCV1CjkSingularValues\C16SingValsofSVDnum12.txt
```

```
j = 1;
k = 4;
Import[
 StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
  "\\C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[12], ".txt" ]]
```

```
1.8926580267875477 1.880158606106111
```

```
(* j=1;
k=4;
Do[
 Print[
  StringJoin[
   "C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
   "\\C",ToString[j],ToString[k],"SingValsofSVDnum", ToString[i],".txt" ]
 ]
 , {i,2,12}] *)
```

```
ToExpression[ StringJoin["C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[i]] ]
```

```
C14SingValsofSVDnumi
```

```
j = 1;
k = 4;
Do[
 Print[
  Import[
   StringJoin[
    "C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
    "\\C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[i], ".txt" ]
  ]
 ]
 , {i, 2, 12}]
```

```
14.088511395429673 8.659684435111325 0.6884254831603384 0.25335404988111376
```

```
3.753056995535095 2.939176569608536 0.8116832525012424 0.3931996611139725
  0.3363253894505036 0.17407797436561276 0.09447782741128295 2.127481861119625e-14
```

```
1.8887155133555702 1.369818414857094 1.033851499279152 0.6936424704838116
  0.5964940122138949 0.5004187449126801 0.43074794236316216 0.4250843295469037
  0.40651553037871174 0.3818367528865757 0.371445660356083 0.294736366366904
  1.4559132639847626e-07 6.414973828507162e-09 3.691804872295697e-15 7.096805390430533e-16
```

1.3598839969053642 0.9711184371937192 0.7777679965290155 0.7632786824711363
0.7038786661184481 0.6786012544873826 0.6592852290634107 0.6503351963288498
0.6262395882658844 0.6026740739398949 0.5921385688064863 0.5663815632342895
0.5107100723124782 0.49305351156419047 0.46199610438621513 0.4106834024731658
0.39052656005050024 0.3022209377333509 0.20787521025700628 0.00038336576388255724
6.575621536026981e-06 6.3364220966309715e-06 1.5215247691746793e-06 1.877428021823059e-08
1.5925790410126033e-08 7.564564902667875e-09 5.651540559389096e-09 2.0861817426979678e-15
1.2343047431629253e-15 7.453580380599379e-16 6.659805531424212e-16 5.306222464957937e-16

1.1744493633375808 0.9293041643670019 0.9187401205902033 0.8420911389456074 0.8197414707774113
0.8090491900609434 0.7969645948075248 0.7859893869440656 0.7757628086960344 0.7435180844984334
0.7222446754763403 0.7017337240659306 0.6427520095854777 0.6065585497483447 0.5903762505071088
0.576582154179682 0.540149816397642 0.46544572011215485 0.4630794233124105 0.4362819045293155
0.41547748345042046 0.4084763898407047 0.3898843471518465 0.3580591143281068
0.3117460990049348 0.27513202388051017 0.12986860672053332 0.008579445090084084
0.0017937283151359435 0.0016079559716831858 0.0015646679583888863 0.0014597478419606908
0.0007656241058937776 0.0006073170149410816 9.62934468188221e-05 8.555219321131326e-05
7.980192018477778e-05 7.392945045708053e-05 6.391493440741226e-05 5.168913836202479e-05
4.8296081368643966e-05 4.3218234468675214e-05 2.1914589327061188e-05 2.9077158809376258e-08
2.4843285894579995e-08 2.3362357756494352e-08 1.6804635989013854e-08 1.3994757184072316e-08
1.2872178509943047e-08 1.1953842708211409e-08 8.526387369027765e-09 5.521389688758958e-09
3.6791857149469802e-09 3.0622957449979313e-15 7.995953683058509e-16 5.031400995762606e-16
3.137731485796441e-16 2.7169002933161633e-16 2.083746720320685e-16 1.8080466680893906e-16
1.5929531903293389e-16 1.295060040690328e-16 1.1483558501014967e-16 1.0757906142358877e-16

1.2658384408646828 1.1509118893194286 1.0983741467124628 1.0079309976094408 0.948550784918791
0.9341754481874428 0.9220839910459332 0.9048650824673393 0.8951938665487292 0.8888235015195626
0.7687830220368554 0.7228895755240888 0.6929152728995406 0.6648432428860265 0.6420221037528936
0.623423536146668 0.6031123596810911 0.577183804131472 0.5513277595250606 0.5280284395445121
0.5243322050604079 0.49751108147626505 0.45478271983274543 0.4380232119165392
0.43495537695329484 0.387596584693923 0.3875079561800164 0.37540791910883736
0.3442923076243814 0.3323530458916579 0.31259152816023633 0.2921186924031766
0.2796038022309513 0.26499955877695974 0.23573595556061908 0.21231876364219177
0.20386591353235545 0.17914111958430118 0.15177930074153856 0.13234076305925277
0.10189033077670923 0.06542019027971667 0.050554472044981175 0.02650322706758053
0.02440072909662459 0.023151147936729947 0.0215266894731874 0.019333923340398806
0.018832176002486205 0.01597396423285484 0.013552735948049342 0.01136196767088698
0.009185030233438727 0.006780254552763283 0.005843484725464627 0.005532307118491932
0.004533121330385443 0.0036169485465811202 0.003183487905611653 0.0031223387623326025
0.0028469680216972387 0.0021730751613514747 0.0012278764073286835 0.0008746522128033403

1.3669536128592743 1.3454771168546937 1.2533782850291415 1.2224697632099917 1.1626361968805028
1.1033162520283166 1.08850048849956 1.071416695002445 0.9849327208032196 0.9537064294312538
0.8989847523595451 0.8870864511618427 0.8808586165181339 0.8505263013144791 0.8220251425645217
0.7866831073260784 0.7761320597901318 0.7393764118205804 0.7138728429773336
0.6859804055138465 0.6555941551683542 0.636933601736595 0.6228207170351926 0.5734738929857257
0.5561098850796637 0.5476509993639426 0.4882638794815287 0.46622687038716254
0.45392958912797554 0.4267980338365026 0.345745215400175 0.3241093134112046

1.56005657965681 1.4620932629105676 1.428191404422225 1.4095489644327936
1.379388264107785 1.332179267391429 1.28514296108315 1.2803146818750397
1.253789270156118 1.2188284600425283 1.1913343674884815 1.1290517842301182
1.1095861200032542 1.0715611979848187 1.001173292872265 0.9961763486535692

```
1.6888213684181959 1.6635031058613887 1.6233849283083945 1.6061688577663709
  1.5802734332236599 1.5551199435998002 1.4989912873345148 1.4530182250467631

1.8172031503754376 1.8072538204575401 1.7731090974416042 1.719584722203624

1.8926580267875477 1.880158606106111
```

```
j = 1;
k = 4;
Do[
 ToExpression[
   StringJoin["C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[i]] ] =
  Import[
   StringJoin[
    "C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
    "\\C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[i], ".txt" ]
  ]
 , {i, 2, 12}]
```

```
14. (10^-4) // N
14.10^(-4) // N
```

```
0.0014

0.0000253002
```

```
Digi
```

```
j = 1;
k = 4;
Import[
 StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues",
  "\\C", ToString[j], ToString[k], "SingValsofSVDnum", ToString[5], ".txt" ]]
StringReplace[Import[StringJoin[
   "C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues", "\\C",
   ToString[j], ToString[k], "SingValsofSVDnum", ToString[5], ".txt" ]], {"e" → "(10^",
  StringJoin["-", DigitCharacter] → StringJoin["(", "-", DigitCharacter, ")"]} ]
```

```
{1.3598839969053642, 0.9711184371937192, 0.7777679965290155, 0.7632786824711363,
  0.7038786661184481, 0.6786012544873826, 0.6592852290634107, 0.6503351963288498,
  0.6262395882658844, 0.6026740739398949, 0.5921385688064863, 0.5663815632342895,
  0.5107100723124782, 0.49305351156419047, 0.46199610438621513, 0.4106834024731658,
  0.39052656005050024, 0.3022209377333509, 0.20787521025700628, 0.00038336576388255724,
  6.575621536026981e-06, 6.3364220966309715e-06, 1.5215247691746793e-06,
  1.877428021823059e-08, 1.5925790410126033e-08, 7.564564902667875e-09,
  5.651540559389096e-09, 2.0861817426979678e-15, 1.2343047431629253e-15,
  7.453580380599379e-16, 6.659805531424212e-16, 5.306222464957937e-16}
```

```
{1.3598839969053642, 0.9711184371937192, 0.7777679965290155, 0.7632786824711363,
   0.7038786661184481, 0.6786012544873826, 0.6592852290634107, 0.6503351963288498,
   0.6262395882658844, 0.6026740739398949, 0.5921385688064863, 0.5663815632342895,
   0.5107100723124782, 0.49305351156419047, 0.46199610438621513,
   0.4106834024731658, 0.39052656005050024, 0.3022209377333509,
   0.20787521025700628, 0.00038336576388255724, 6.575621536026981(10^ ~~
 (- <> DigitCharacter <> ) ~~ 6, 6.3364220966309715(10^ ~~
 (- <> DigitCharacter <> ) ~~
 6, 1.5215247691746793(10^ ~~
 (- <> DigitCharacter <> ) ~~
 6, 1.877428021823059(10^ ~~
 (- <> DigitCharacter <> ) ~~
 8, 1.5925790410126033(10^ ~~
 (- <> DigitCharacter <> ) ~~ 8, 7.564564902667875(10^ ~~
 (- <> DigitCharacter <> ) ~~ 9, 5.651540559389096(10^ ~~
 (- <> DigitCharacter <> ) ~~ 9, 2.0861817426979678(10^ ~~
 (- <> DigitCharacter <> ) ~~ 5, 1.2343047431629253(10^ ~~
 (- <> DigitCharacter <> ) ~~ 5, 7.453580380599379(10^ ~~
 (- <> DigitCharacter <> ) ~~ 6, 6.659805531424212(10^ ~~
 (- <> DigitCharacter <> ) ~~ 6, 5.306222464957937(10^ ~~
 (- <> DigitCharacter <> ) ~~ 6}
```

```
StringReplace[Import[StringJoin[
   "C:\\Users\\George\\Documents\\SVD DNA stuff\\CombinedPCV1CjkSingularValues", "\\C",
   ToString[j], ToString[k], "SingValsofSVDnum", ToString[5], ".txt" ]], {"e" → "(10^("} ]
```

```
{1.3598839969053642, 0.9711184371937192, 0.7777679965290155, 0.7632786824711363,
  0.7038786661184481, 0.6786012544873826, 0.6592852290634107, 0.6503351963288498,
  0.6262395882658844, 0.6026740739398949, 0.5921385688064863, 0.5663815632342895,
  0.5107100723124782, 0.49305351156419047, 0.46199610438621513, 0.4106834024731658,
  0.39052656005050024, 0.3022209377333509, 0.20787521025700628, 0.00038336576388255724,
  6.575621536026981(10^(-06, 6.3364220966309715(10^(-06, 1.5215247691746793(10^(-06,
  1.877428021823059(10^(-08, 1.5925790410126033(10^(-08, 7.564564902667875(10^(-09,
  5.651540559389096(10^(-09, 2.0861817426979678(10^(-15, 1.2343047431629253(10^(-15,
  7.453580380599379(10^(-16, 6.659805531424212(10^(-16, 5.306222464957937(10^(-16}
```

```
C14SingValsofSVDnum5 =
 ToExpression["{1.3598839969053642, 0.9711184371937192, 0.7777679965290155,
    0.7632786824711363, 0.7038786661184481, 0.6786012544873826, 0.6592852290634107,
    0.6503351963288498, 0.6262395882658844, 0.6026740739398949, 0.5921385688064863,
    0.5663815632342895, 0.5107100723124782, 0.49305351156419047,
    0.46199610438621513, 0.4106834024731658, 0.39052656005050024,
    0.3022209377333509, 0.20787521025700628, 0.00038336576388255724,
    6.575621536026981(10^(-06)), 6.3364220966309715(10^(-06)),
    1.5215247691746793(10^(-06)), 1.877428021823059(10^(-08)),
    1.5925790410126033(10^(-08)), 7.564564902667875(10^(-09)),
    5.651540559389096(10^(-09)), 2.0861817426979678(10^(-15)),
    1.2343047431629253(10^(-15)), 7.453580380599379(10^(-16)),
    6.659805531424212(10^(-16)), 5.306222464957937(10^(-16))}" ]
```

$$\{1.35988, 0.971118, 0.777768, 0.763279, 0.703879, 0.678601, 0.659285, 0.650335,\ 0.62624, 0.602674, 0.592139, 0.566382, 0.51071, 0.493054, 0.461996, 0.410683,\ 0.390527, 0.302221, 0.207875, 0.000383366, 6.57562\times10^{-6}, 6.33642\times10^{-6},\ 1.52152\times10^{-6}, 1.87743\times10^{-8}, 1.59258\times10^{-8}, 7.56456\times10^{-9}, 5.65154\times10^{-9},\ 2.08618\times10^{-15}, 1.2343\times10^{-15}, 7.45358\times10^{-16}, 6.65981\times10^{-16}, 5.30622\times10^{-16}\}$$

```
Length[C14SingValsofSVDnum5]
```

```
32
```

```
Table[{iter, C14SingValsofSVDnum5[[iter]]}, {iter, 1, Length[C14SingValsofSVDnum5]}]
```

$$\{\{1, 1.35988\}, \{2, 0.971118\}, \{3, 0.777768\}, \{4, 0.763279\}, \{5, 0.703879\},\ \{6, 0.678601\}, \{7, 0.659285\}, \{8, 0.650335\}, \{9, 0.62624\}, \{10, 0.602674\},\ \{11, 0.592139\}, \{12, 0.566382\}, \{13, 0.51071\}, \{14, 0.493054\}, \{15, 0.461996\},\ \{16, 0.410683\}, \{17, 0.390527\}, \{18, 0.302221\}, \{19, 0.207875\}, \{20, 0.000383366\},\ \{21, 6.57562\times10^{-6}\}, \{22, 6.33642\times10^{-6}\}, \{23, 1.52152\times10^{-6}\}, \{24, 1.87743\times10^{-8}\},\ \{25, 1.59258\times10^{-8}\}, \{26, 7.56456\times10^{-9}\}, \{27, 5.65154\times10^{-9}\}, \{28, 2.08618\times10^{-15}\},\ \{29, 1.2343\times10^{-15}\}, \{30, 7.45358\times10^{-16}\}, \{31, 6.65981\times10^{-16}\}, \{32, 5.30622\times10^{-16}\}\}$$

Plots of Singular Values of Combined PCV1 Samples Cjk

C15

C16

C17

C18

C19

Random (Marchenko-Pastur) Distribution SVD analog of C19, call it MPC19

Cut sample C_{1,32}

Cut sample C_{1,32} data

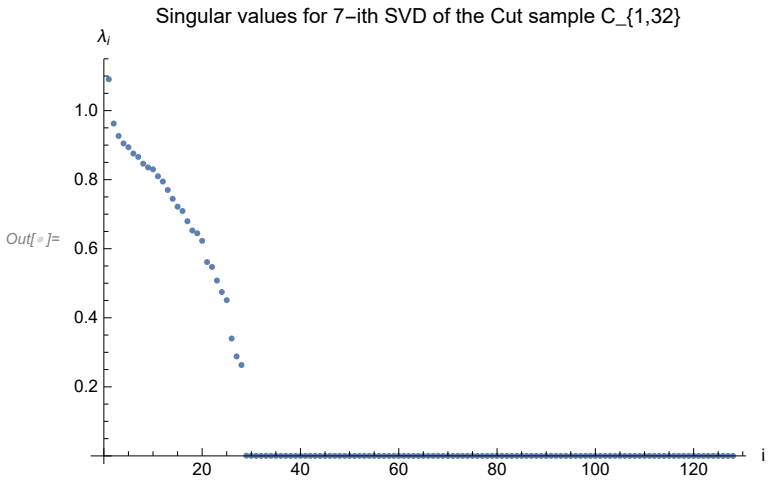
Cut sample C_{1,32} data plots

In[•]:=
```
Table[{k, CutC1to32[[k]]}, {k, 1, Length[CutC1to32]}]
```

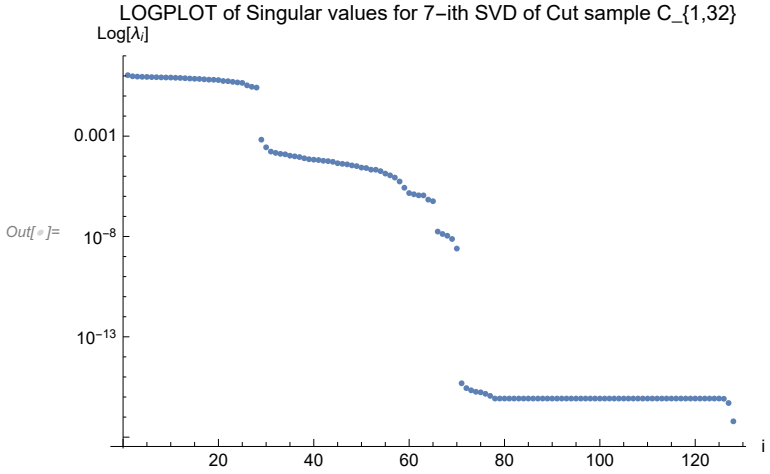
Out[•]=
```
{{1, 1.09086}, {2, 0.962425}, {3, 0.926492}, {4, 0.904965}, {5, 0.893919}, {6, 0.875662},
 {7, 0.865863}, {8, 0.846116}, {9, 0.835332}, {10, 0.83002}, {11, 0.809739}, {12, 0.794524},
 {13, 0.770083}, {14, 0.744616}, {15, 0.7217}, {16, 0.709288}, {17, 0.679583},
 {18, 0.652795}, {19, 0.644678}, {20, 0.622975}, {21, 0.561385}, {22, 0.54721},
 {23, 0.507801}, {24, 0.474523}, {25, 0.451047}, {26, 0.339941}, {27, 0.288126},
 {28, 0.263079}, {29, 0.000666255}, {30, 0.000277524}, {31, 0.000170296}, {32, 0.000146546},
 {33, 0.000131282}, {34, 0.000124474}, {35, 0.000105946}, {36, 0.000098526},
 {37, 0.00009089}, {38, 0.0000790127}, {39, 0.0000707403}, {40, 0.0000671636},
 {41, 0.0000643872}, {42, 0.0000591848}, {43, 0.0000567926}, {44, 0.0000526031},
 {45, 0.0000445858}, {46, 0.0000416892}, {47, 0.0000392429}, {48, 0.0000348008},
 {49, 0.0000321145}, {50, 0.0000271068}, {51, 0.0000257536}, {52, 0.0000213848},
 {53, 0.0000211667}, {54, 0.0000180096}, {55, 0.0000136388}, {56, 0.0000111381},
 {57, 8.62431 × 10^-6}, {58, 5.49551 × 10^-6}, {59, 2.68224 × 10^-6}, {60, 1.45461 × 10^-6},
 {61, 1.26868 × 10^-6}, {62, 1.1232 × 10^-6}, {63, 1.11688 × 10^-6}, {64, 6.85269 × 10^-7},
 {65, 5.7153 × 10^-7}, {66, 1.75776 × 10^-8}, {67, 1.33094 × 10^-8}, {68, 1.08756 × 10^-8},
 {69, 7.51146 × 10^-9}, {70, 2.4959 × 10^-9}, {71, 4.84438 × 10^-16}, {72, 2.77836 × 10^-16},
 {73, 2.1627 × 10^-16}, {74, 1.8205 × 10^-16}, {75, 1.71223 × 10^-16}, {76, 1.44849 × 10^-16},
 {77, 1.13912 × 10^-16}, {78, 8.39411 × 10^-17}, {79, 8.39411 × 10^-17}, {80, 8.39411 × 10^-17},
 {81, 8.39411 × 10^-17}, {82, 8.39411 × 10^-17}, {83, 8.39411 × 10^-17}, {84, 8.39411 × 10^-17},
 {85, 8.39411 × 10^-17}, {86, 8.39411 × 10^-17}, {87, 8.39411 × 10^-17}, {88, 8.39411 × 10^-17},
 {89, 8.39411 × 10^-17}, {90, 8.39411 × 10^-17}, {91, 8.39411 × 10^-17}, {92, 8.39411 × 10^-17},
 {93, 8.39411 × 10^-17}, {94, 8.39411 × 10^-17}, {95, 8.39411 × 10^-17}, {96, 8.39411 × 10^-17},
 {97, 8.39411 × 10^-17}, {98, 8.39411 × 10^-17}, {99, 8.39411 × 10^-17}, {100, 8.39411 × 10^-17},
 {101, 8.39411 × 10^-17}, {102, 8.39411 × 10^-17}, {103, 8.39411 × 10^-17}, {104, 8.39411 × 10^-17},
 {105, 8.39411 × 10^-17}, {106, 8.39411 × 10^-17}, {107, 8.39411 × 10^-17}, {108, 8.39411 × 10^-17},
 {109, 8.39411 × 10^-17}, {110, 8.39411 × 10^-17}, {111, 8.39411 × 10^-17}, {112, 8.39411 × 10^-17},
 {113, 8.39411 × 10^-17}, {114, 8.39411 × 10^-17}, {115, 8.39411 × 10^-17}, {116, 8.39411 × 10^-17},
 {117, 8.39411 × 10^-17}, {118, 8.39411 × 10^-17}, {119, 8.39411 × 10^-17}, {120, 8.39411 × 10^-17},
 {121, 8.39411 × 10^-17}, {122, 8.39411 × 10^-17}, {123, 8.39411 × 10^-17}, {124, 8.39411 × 10^-17},
 {125, 8.39411 × 10^-17}, {126, 8.18024 × 10^-17}, {127, 5.01524 × 10^-17}, {128, 6.13445 × 10^-18}}
```

In[•]:=
```
ListPlot[CutC1to32, PlotLabel → StringJoin["Singular values for ",
   ToString[7], "-ith SVD of the Cut sample C_{1,32}"], AxesLabel → {"i", "λi"}]
ListLogPlot[CutC1to32, PlotLabel → StringJoin["LOGPLOT of Singular values for ",
   ToString[7], "-ith SVD of Cut sample C_{1,32}"], AxesLabel → {"i", "Log[λi]"}]
```

Out[•]=



Out[•]=



Comparison