```
j = 1;
k = 4;
"These index the samples used, ie if
we combine DNA samples 1 to 4 we let j =1 and k = 4"
```

## Gammas and Lambdas for Canonical form

```
These index the samples used, ie if we combine DNA samples 1 to 4 we let j = 1 and k = 4
(*num=2;*)
(*StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\MPSs\\Lambdas",
    "\\Lambda",ToString[j],ToString[k],"ofSVDnum", ToString[2],".txt" ]
   Import[StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\MPSs\\Lambdas",
      "\\Lambda",ToString[j],ToString[k],"ofSVDnum", ToString[2],".txt" ]];*)
 Table [\Lambda_{num} = ToExpression [StringReplace [
        Import[StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\MPSs\\Lambdas",
           "\\Lambda", ToString[j], ToString[k], "ofSVDnum", ToString[num], ".txt"]],
         {"e" \rightarrow "*10^", "[" \rightarrow "{", "]" \rightarrow "}"}]], {num, 2, 12}];
 Table[Γ<sub>num</sub> = ToExpression[StringReplace[
        Import[StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\MPSs\\Gammas",
           "\\Gamma", ToString[j], ToString[k], "ofSVDnum", ToString[num], ".txt"]],
         {\text{"e"} \rightarrow \text{"*10^"}, \text{"["} \rightarrow \text{"{", "]"} \rightarrow \text{"}}}]], {\text{num, 2, 12}}];
  (\Gamma_2. \Lambda_2). (\Gamma_3. \Lambda_3). (\Gamma_4. \Lambda_4). (\Gamma_5. \Lambda_5). (\Gamma_6. \Lambda_6).
   (\Gamma_7. \Lambda_7).(\Gamma_8. \Lambda_8).(\Gamma_9. \Lambda_9).(\Gamma_{10}. \Lambda_{10}).(\Gamma_{11}. \Lambda_{11}).(\Gamma_{12}. \Lambda_{12})
```



## Resizing

```
\begin{split} &\text{Do}\left[A_{\text{num}} = (\Gamma_{\text{num}}, \Lambda_{\text{num}})\,,\, \{\text{num},\, 2,\, 12\}\,] \\ &\text{maxdim} = \text{Max}\left[\text{Flatten}\left[\text{Table}\left[\left\{\text{Length}\left[A_{\text{num}}\right],\, \text{Length}\left[A_{\text{num}}\left[\left[1\right]\right]\right]\right\},\, \{\text{num},\, 2,\, 12\}\right]\right] \\ &\text{Do}\left[B_{\text{num}} = \text{ArrayPad}\left[A_{\text{num}},\, \left\{\left\{\emptyset,\, \left(\text{maxdim} - \text{Length}\left[A_{\text{num}}\right]\right)\right\},\, \left\{\emptyset,\, \left(\text{maxdim} - \text{Length}\left[A_{\text{num}}\left[\left[1\right]\right]\right]\right)\right\}\right\}\right],\, \{\text{num},\, 2,\, 12\}\right] \\ &\text{1024} \\ &(A_2) \cdot (A_3) \cdot (A_4) \cdot (A_5) \cdot (A_6) \cdot (A_7) \cdot (A_8) \cdot (A_9) \cdot (A_{10}) \cdot (A_{11}) \cdot (A_{12}) \\ &\text{\$Aborted} \end{split}
```

```
Table \hbox{\tt [\{"=num"num, Length[A_{num}], Length[A_{num}[[1]]]\}, \{num, 2, 12\}]}
\{\{2 = num, 4, 1024\}, \{3 = num, 8, 512\}, \{4 = num, 16, 256\},
 \{5 = \text{num}, 32, 128\}, \{6 = \text{num}, 64, 64\}, \{7 = \text{num}, 128, 32\}, \{8 = \text{num}, 64, 16\},
 \{9 = num, 32, 8\}, \{10 = num, 16, 4\}, \{11 = num, 8, 2\}, \{12 = num, 4, 1\}\}
Table[\{"=num"num, Length[B_{num}], Length[B_{num}[[1]]]\}, \{num, 2, 12\}]
\{\{2 = \text{num}, 1024, 1024\}, \{3 = \text{num}, 1024, 1024\}, \{4 = \text{num}, 1024, 1024\}, \{5 = \text{num}, 1024, 1024\}, \}
 {6 = num, 1024, 1024}, {7 = num, 1024, 1024}, {8 = num, 1024, 1024}, {9 = num, 1024, 1024},
 {10 = num, 1024, 1024}, {11 = num, 1024, 1024}, {12 = num, 1024, 1024}}
mpsB = (B_2) \cdot (B_3) \cdot (B_4) \cdot (B_5) \cdot (B_6) \cdot (B_7) \cdot (B_8) \cdot (B_9) \cdot (B_{10}) \cdot (B_{11}) \cdot (B_{12});
Union[Flatten[mpsB]]
\{0., 5.0146 \times 10^{94}, 1.10321 \times 10^{95}, 5.65829 \times 10^{95}, 1.24482 \times 10^{96}\}
Outer[\texttt{Times,}\ (B_2)\ ,\ (B_3)\ ,\ (B_4)\ ,\ (B_5)\ ,\ (B_6)\ ,\ (B_7)\ ,\ (B_8)\ ,\ (B_9)\ ,\ (B_{10})\ ,\ (B_{11})\ ,\ (B_{12})\ ]
*If[Length[A_{num}] \leq Length[A_{(num-1)}[[1]]],
                                                                                                                +
 ArrayPad[A_{num}, \{0, (Length[A_{(num-1)}[[1]]] - Length[A_{(num)}])\}]
(*
ArrayPad[{{1, 2}, {3, 4}, {5, 6}}, {{0, 1}, {0, 2}}] // MatrixForm
 3 4 0 0
 5 6 0 0
 0 0 0 0
 1 2 3 4) (3 4 3 4
                  7 6 8 9
  2 5 8 9
  4 6 1 3
                  4
                     6 1 3
5 7 8 1 5 7 8 1
\left(\begin{array}{cc}1&2\\2&5\end{array}\right)\cdot\left(\begin{array}{cc}3&4\\7&6\end{array}\right)
\{\{49, 62, 54, 35\}, \{118, 149, 126, 86\}, \{73, 79, 85, 76\}, \{101, 117, 87, 108\}\}
\{\{17, 16, 0, 0\}, \{41, 38, 0, 0\}, \{0, 0, 0, 0\}, \{0, 0, 0, 0\}\}
\{\{17, 16\}, \{41, 38\}\}
```

Although in the code technically starts with files Lambda 2 and Gamma 2, this is more for naming

Also need to reshape Lamdas after midpoint so that we can properly combine them with gammas

Also deal with e's so they don't mess anything up

```
Table[{" = num" num, Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]}, {num, 2, 12}]
Table[{" = num" num, Length[\Gamma_{num}], Length[\Gamma_{num}[[1]]]}, {num, 2, 12}]
\{\{2 = num, 4, 1024\}, \{3 = num, 8, 512\}, \{4 = num, 16, 256\},
 {5 = num, 32, 128}, {6 = num, 64, 64}, {7 = num, 128, 32}, {8 = num, 64, 16},
 \{9 = num, 32, 8\}, \{10 = num, 16, 4\}, \{11 = num, 8, 2\}, \{12 = num, 4, 1\}\}
\{\{2 = \text{num}, 4, 4\}, \{3 = \text{num}, 8, 8\}, \{4 = \text{num}, 16, 16\}, \}
 \{5 = \text{num}, 32, 32\}, \{6 = \text{num}, 64, 64\}, \{7 = \text{num}, 128, 128\}, \{8 = \text{num}, 64, 64\},
 {9 = num, 32, 32}, {10 = num, 16, 16}, {11 = num, 8, 8}, {12 = num, 4, 4}}
```

Table [  $(\Gamma_{num}$ .  $\Lambda_{num})$  , {num, 2, 12}] (\*coupled gammas and lambdas properly shaped to combine, just need to reshape lambdas from midpoint on \*)

```
{{\lime_1\limes_}, {\limes_1\limes_}, {\limes_1\limes_}, {\limes_5\limes_},
 \{\{-4.40931 \times 10^{11}, 1.2594 \times 10^{11}\}, \{\{-4.40931 \times 10^{11}, 1.2594 \times 10^{11}\},
    \left\{-3.01476 \times 10^{11}, -1.84197 \times 10^{11}\right\}, \left\{-3.43588 \times 10^{11}, 9.81368 \times 10^{10}\right\},
    \{-2.3492 \times 10^{11}, -1.43532 \times 10^{11}\}, \{0., 0.\}, \{0., 0.\}, \{0., 0.\}, \{0., 0.\}\}
 \{\{3.28985 \times 10^{11}\}, \{8.99369 \times 10^{11}\}, \{1.37432 \times 10^{11}\}, \{3.75707 \times 10^{11}\}\}\}
large output
                     show less
                                        show more
                                                            show all
                                                                             set size limit...
```

Gammas square, just need to make lambdas square by inserting apprpriately sized rows of zeroes

```
ArrayPad[{{1, 2}, {3, 4}}, {0, 2}] // MatrixForm
```

```
1 2 0 0
3 4 0 0
0 0 0 0
0 0 0 0
```

```
Clear[num]
Max[Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]]
1024
(* If [Length [\Lambda_{num}] > Length [\Lambda_{num} [[1]]],
   PadRight [Λ<sub>num</sub> [[i]], Length [Λ<sub>num</sub>]], PadRight [Λ<sub>num</sub> [[1]], Length [Λ<sub>num</sub>]]];*)
Do [
 padded\Lambda_{num} = ArrayPad[\Lambda_{num}, \{0, Max[Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]]\}]
 , {num, 2, 12}]
Table[{" = num" num, Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]}, {num, 2, 12}]
Table[{" =num" num, Length[padded\Lambda_{num}], Length[padded\Lambda_{num}[[1]]]}, {num, 2, 12}]
\{\{2 = num, 4, 1024\}, \{3 = num, 8, 512\}, \{4 = num, 16, 256\},
 \{5 = \text{num}, 32, 128\}, \{6 = \text{num}, 64, 64\}, \{7 = \text{num}, 128, 32\}, \{8 = \text{num}, 64, 16\},
 \{9 = num, 32, 8\}, \{10 = num, 16, 4\}, \{11 = num, 8, 2\}, \{12 = num, 4, 1\}\}
\{\{2 = \text{num}, 1028, 2048\}, \{3 = \text{num}, 520, 1024\}, \{4 = \text{num}, 272, 512\}, \}
 \{5 = \text{num}, 160, 256\}, \{6 = \text{num}, 128, 128\}, \{7 = \text{num}, 256, 160\}, \{8 = \text{num}, 128, 80\},
 \{9 = \text{num}, 64, 40\}, \{10 = \text{num}, 32, 20\}, \{11 = \text{num}, 16, 10\}, \{12 = \text{num}, 8, 5\}\}
```

```
\Lambda_{num} // MatrixForm
(*padded\Lambda_{num}//MatrixForm*)
 0.99952
            0
                    0
                             0
                                   0.995293
                    0
                             0
                                   0 0 0 0 0 0 0
                                                    0 0 0 0 0 0 0 0 0 0
                                                                             0
                                                                               0 1
                 0.096869
    0
            0
                             0
                                   0
            0
                    0
                          PadRight[{1, 2, 3, 4, 5, 6}, 10]
PadRight[{1, 2, 3, 4, 5, 6, 7, 8}, 10]
PadRight[{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, 10]
\{1, 2, 3, 4, 5, 6, 0, 0, 0, 0\}
\{1, 2, 3, 4, 5, 6, 7, 8, 0, 0\}
\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}
\Lambda_9 \lceil \lceil \mathbf{1} \rceil \rceil
PadRight [\Lambda_9[[1]], Length [\Lambda_9]
\Lambda_9 [ [1] ]
{1.41421, 0, 0, 0, 0, 0, 0, 0}
\{1.41421, 0, 0, 0, 0, 0, 0, 0, 0\}
A = IdentityMatrix[3]
A[[1]] = \{1, 2, 3\}
Α
0 A
\{\{1,0,0\},\{0,1,0\},\{0,0,1\}\}
{1, 2, 3}
\{\{1, 2, 3\}, \{0, 1, 0\}, \{0, 0, 1\}\}
\{\{0,0,0,0\},\{0,0,0\},\{0,0,0\}\}
Do[resized\Lambda_{num} = 0 IdentityMatrix[Max[Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]]], \{num, 2, 12\}]
(* If [Length [\Lambda_{num}] > Length [\Lambda_{num} [[1]]],
  PadRight[\Lambda_{num}[[i]], Length[\Lambda_{num}]], PadRight[\Lambda_{num}[[1]], Length[\Lambda_{num}]]]; *)
resized\Lambda_{10}[[1]]
PadRight [\Lambda_9[[1]], Length [\Lambda_9]
```

```
Do[resized\Lambda_{num} = 0 IdentityMatrix[Max[Length[\Lambda_{num}], Length[\Lambda_{num}[[1]]]]], \{num, 2, 12\}]
   Do [
    Do [
      resized\Lambda_{num}[[i]] = PadRight[\Lambda_{num}[[i]], Length[\Lambda_{num}]]
      , {i, 1, Length [\Lambda_{num}]}
    ], {num, 2, 12}
   Λ2;
   resized\Lambda_2;
   Table[resized\Lambda_{num}, {num, 2, 12}];
      {{\left(\text{--1}\text{--}\)}, {\left(\text{--1}\text{--1}\)}, {\left(\text{--1}\text{--1}\)}, {\left(\text{--1}\text{--1}\)}, {\left(\text{--1}\text{--1}\)}, {\left(\text{--1}\text{--1}\)},
        \{0, 0, 0, 0, 0, 0, 0, 0, 0\}, \{0, 0, 0, 0, 0, 0, 0, 0, 0\}, \{0, 0, 0, 0, 0, 0, 0, 0, 0\},
        \{0, 0, 0, 0, 0, 0, 0, 0\}, \{0, 0, 0, 0, 0, 0, 0, 0\}, \{0, 0, 0, 0, 0, 0, 0, 0\}\},
       \{\{0,0,0,0\},\{0,0,0,0\},\{0,0,0,0\},\{0,0,0,0\}\}\}
     large output
                      show less
                                     show more
                                                     show all
                                                                   set size limit...
   Table [Length [ (\Gamma_{num} \cdot \Lambda_{num}) ], {num, 2, 12}]
   Table [Length [ (\Gamma_{num} \cdot \Lambda_{num}) [ [1] ] ], {num, 2, 12} ]
   {4, 8, 16, 32, 64, 128, 64, 32, 16, 8, 4}
   {1024, 512, 256, 128, 64, 32, 16, 8, 4, 2, 1}
M's
    Table[M<sub>num</sub> = ToExpression[StringReplace[
            Import[StringJoin["C:\\Users\\George\\Documents\\SVD DNA stuff\\MPSs\\Ms",
               "\\mpsM", ToString[j], ToString[k], "ofSVDnum", ToString[num], ".txt"]],
            {\text{"e"} \rightarrow \text{"}*10^{\text{"}}, \text{"["} \rightarrow \text{"{", "]"} \rightarrow \text{"}}}]], {\text{num, 2, 12}}];
   Table[{" =num" num, Length[M<sub>num</sub>], Length[M<sub>num</sub>[[1]]]}, {num, 2, 12}]
   \{\{2 = \text{num}, 4, 1024\}, \{3 = \text{num}, 8, 512\}, \{4 = \text{num}, 16, 256\}, \}
    \{5 = \text{num}, 32, 128\}, \{6 = \text{num}, 64, 64\}, \{7 = \text{num}, 128, 32\}, \{8 = \text{num}, 64, 16\},
    \{9 = num, 32, 8\}, \{10 = num, 16, 4\}, \{11 = num, 8, 2\}, \{12 = num, 4, 1\}\}
   (M_2) \cdot (M_3) \cdot (M_4) \cdot (M_5) \cdot (M_6) \cdot (M_7) \cdot (M_8) \cdot (M_9) \cdot (M_{10}) \cdot (M_{11}) \cdot (M_{12})
   { (3420.86, -68742.3, -58761.1, -38341.4, 595.435, 578.617, 5642.45, 5642.45, 4602.3,
       4568.92, 3194.68, 3194.68, -221.658, -313.646, -2083.9, -2150.66, 114.811, 148.191,
       545.236, 545.492, 8669.52, 8666.08, 5584.02, 5617.4, -2033.89, -2067.01, 5836.16,
       5894.76, 4529.3, 4495.67, 545.236, 545.492, 5392.1, 5392.1, 5994.46, 6028.09, -1841.89,
       -1909.16, 4298.54, 4264.07, 204.133, 170.497, 612.253, 612.253, 5551., 5517.62,
       170.753, 137.372, 3110.84, 3111.1, 1304.11, 1304.11, -1724.93, -1791.95, 3111.1,
       3111.1, 7810.33, 7810.33, -1729.26, -1796.02, 5969.74, 5969.49, 95.7108, 95.7108,
       3010.7, 3010.96, 1304.11, 1304.11, 2982.64, 2923.97, -1637.53, -1637.53, 6032.81,
       6023.7, 5796.53, 5763.15, 1112.7, 1112.96, 5241.89, 5241.89, 161.704, 154.062,
```

9062.18, 9033.26, 6086.77, 6090.46, 5450.6, 5425.63, 5383.84, 5359., 5317.21, 5258.6,

47.7943, 81.1746, 5711.28, 5673.71, 3328.73, 3261.72, -1266.08, -1266.08, 3169.71, 3169.71, 64.6123, 97.9926, 131.373, 131.117, 4642.72, 4642.98, -1404.25, -1403.74, 5241.89, 5267.11, 5304.44, 5304.44, 4415.32, 4386.38, 5175.13, 5241.89, 5392.25, 5384.1, 5325.62, 5291.98, 5250.19, 5225.48, -105.083, -112.98, 1396.56, 1396.56, 4448.7, 4419.76, -46.2195, -79.8556, -1421.01, -1420.49, 3319.79, 3319.79, 3319.79, 3319.79, -238.092, -271.473, -1428.84, -1428.84, 5121.11, 5154.49, 5250.58, 5225.48, -1458.02, -1524.78, -1524.78, -1566.31, 3378.27, 3378.27, 3378.27, 3378.27, 214.696, 248.332, 9283.62, 9220.93, 5308.9, 5342.28, 1304.11, 1304.11, -313.262, -413.403, 5337.82, 5337.82, 6303.42, 6387., 6395.15, 6491.66, 7159.67, 7159.42, 4225.74, 4192.36, 3312.04, 3278.85, 6541.16, 6633.14, 9538.3, 9475.75, -179.741, -213.121, 9404.52, 9371.27, 5324., 5290.87, 3069.44, 3069.44, 5463.06, 5463.06, 1413.38, 1446.76, -882.525, -949.286, 3102.82, 3102.82, 9350.25, 9317., 3868.41, 3835.03, 448.614, 481.994, 1304.11, 1304.11, 5103.11, 5069.47, 464.665, 515.119, 5450.58, 5450.58, 3705.59, 3676.41, 3236.34, 3236.34, 3489.16, 3489.16, 9450.52, 9387.58, 9349.99, 9325.28, 1046.45, 1046.2, 1029.63, 1029.63, 3763.37, 3763.62, 498.301, 531.681, 3020.22, 2986.84, 6979.56, 7041.86, 1304.11, 1304.11, 3861.69, 3828.31, 7029.5, 7096.01, 1304.11, 1304.11, 3825.18, 3791.8, 1304.11, 1304.11, 1304.11, 1304.11, 1304.11, 1304.11, 5166.78, 5166.78, 1304.11, 1304.11, 729.212, 745.774, 5484.11, 5475.96, 5133.4, 5133.4, 5450.73, 5409.2, 5384.22, 5342.31, 6975.95, 6975.95, 5225.48, 5166.87, -198.676, -198.164, 3879.15, 3879.4, 237.513, 170.369, 7313.36, 7371.72, 5225.48, 5200.51, 3908.36, 3908.61, 1163.16, 1129.52, 6975.95, 6975.95, 3605.45, 3572.13, 4049.85, 4049.85, 3111.1, 3111.1, 1304.11, 1304.11, 5457.87, 4828.84, 9112.25, 9049.7, 206.54, 206.54, 3638.63, 3630.48, 265.403, 198.642, 1096.4, 1063.01, 1096.4, 1063.01, 9033.26, 8999.63, 3563.85, 3526.01, 3526.01, 3492.63, 8845.6, 8816.16, 6959.14, 6959.14, 7859.62, 7922.43, 5175.28, 5150.56, 6959.14, 6959.14, 6959.14, 6959.14, 4858.16, 4833.32, 6959.14, 6959.14, 6959.14, 6959.14, 6959.14, 6959.14, 6959.14, 6959.14, 4501.11, 4467.48, 8845.6, 8845.6, 3930.97, 3893.19, 6959.14, 6959.14, 4561.63, 4527.99, 828.841, 829.097, 8214.31, 8214.31, 8214.31, 8214.31, 4332.27, 4332.27, 8214.31, 8214.31, 4369.86, 4369.86, 1113.81, 1080.17, 8214.31, 8214.31, 4549.59, 4524.36, 4465.88, 4432.5, 3053.6, 2990.79, 8214.31, 8214.31, 8828.91, 8828.91, 8828.91, 8828.91, 6975.83, 6975.83, 8214.31, 8214.31, 1297.27, 1263.64, 798.979, 815.542, 832.36, 865.74, 8214.31, 8214.31, 4766.41, 4766.41, 4672.19, 4672.19, 4672.19, 4672.19, 4672.19, 3734.64, 3764.07, 4353.36, 4353.36, 4672.19, 4672.19, 5034.71, 844.083, 4223.53, 4223.53, 2685.95, 2685.95, 6717.32, 6717.32, 528.674, 528.93, 2619.19, 2619.19, 6825.74, 6825.74, 1754.58, 1754.84, 1304.11, 1304.11, 1687.82, 1688.08, 662.451, 628.815, 3732.44, 3732.44, 4445.73, 4445.73, 1746.18, 1746.43, 4035.8, 4035.8, 4672.19, 4672.19, 8214.31, 8214.31, 4672.19, 4672.19, 1464.18, 1405.57, 3732.44, 3732.44, 3732.44, 3732.44, 8828.91, 8828.91, 4672.19, 4672.19, 4445.73, 4445.73, 1447.61, 1380.34, 3593.51, 3593.51, 1232.92, 1266.05, 3732.44, 3732.44, 4206.36, 4264.96, 6466.97, 6425.05, 6416.77, 6400.08, 4672.19, 4672.19, 695.831, 695.831, 3732.44, 3732.44, 3222.12, 3222.12, 4482.96, 4415.94, 7776.1, 7734.31, 1304.11, 1304.11, 4449.32, 4382.69, 1505.97, 1438.69, 2084.44, 2084.44, 1304.11, 1304.11, 3287.33, 3253.69, 3389.02, 3389.02, 962.618, 962.874, 4389.95, 4448.56, 4452.5, 4511.11, 8833.24, 8866.62, 8900., 8929.17, 4249.17, 4190.3, 4157.43, 4090.42, 2330.65, 2330.65, 3451.64, 3451.64, 1304.11, 1304.11, 2924.28, 2894.85, 7371.2, 7304.44, 8708.13, 8737.3, 7183.47, 7116.71, 3572.61, 3572.61, 1032.64, 1048.95, 2865.87, 2832.23, 6817.33, 6800.64, 7079.19, 7012.3, 6953.95, 6895.6, 6808.92, 6783.83, 3647.98, 3647.98, 6808.92, 6808.92, 8365.91, 8411.78, 8461.85, 8507.72, 3732.44, 3732.44, 2832.42, 2832.42, 2832.42, 2832.42, 8269.98, 8315.84, 2832.42, 2832.42, 378.59, 361.772, 2510.1, 2510.1, 4445.73, 4445.73, 2573.88, 2540.5, 4445.73, 4445.73, 6883.97, 6875.56,

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  2.44317 \times 10^{7}, 1.33562 \times 10^{7}, 1.65898 \times 10^{7}, 1.11281 \times 10^{6}, 3.19193 \times 10^{7}, 4.64611 \times 10^{7},
  4.93084 \times 10^{7}, 1.11003 \times 10^{7}, 3.65194 \times 10^{7}, 1.24356 \times 10^{7}, 1.22313 \times 10^{7}, 3.63399 \times 10^{7},
  3.47582 \times 10^{7}, 1.94306 \times 10^{7}, 1.78481 \times 10^{7}, 2.67931 \times 10^{7}, 1.27234 \times 10^{7}, 3.85338 \times 10^{7},
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  1.19165 \times 10^{7}, 2.48338 \times 10^{7}, 2.0733 \times 10^{7}, 9.88163 \times 10^{6}, 2.08063 \times 10^{7}, 1.28691 \times 10^{7},
  3.34455 \times 10^7, 1.00736 \times 10^7, 1.11138 \times 10^7, -1.60352 \times 10^6, 2.68054 \times 10^7,
  1.41527 \times 10^{7}, 3.46525 \times 10^{7}, 1.18613 \times 10^{7}, 1.12516 \times 10^{6}, 2.12911 \times 10^{7}, 1.26517 \times 10^{7},
  8.79053 \times 10^{6}, 1.83464 \times 10^{7}, -7.08399 \times 10^{6}, 483543., 8.80146 \times 10^{6}, -1.12363 \times 10^{7},
  7.56719 \times 10^{6}, 1.57371 \times 10^{7}, 3.02495 \times 10^{6}, 5.32307 \times 10^{6}, 1.04872 \times 10^{7}, 1.35748 \times 10^{7},
  1.66531 \times 10^{6}, 8.75023 \times 10^{6}, 4.67011 \times 10^{6}, 1.999 \times 10^{7}, 8.85802 \times 10^{6}, 2.74771 \times 10^{7},
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  9.42669 \times 10^{6}, 5.15332 \times 10^{6}, 6.40099 \times 10^{6}, 429364., 1.23157 \times 10^{7}, 1.79265 \times 10^{7},
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  1.3411 \times 10^{7}, 7.49707 \times 10^{6}, 6.88647 \times 10^{6}, 1.03378 \times 10^{7}, 4.90918 \times 10^{6}, 1.48678 \times 10^{7},
  5.25243 \times 10^{6}, 1.29187 \times 10^{7}, 1.91803 \times 10^{7}, 5.47038 \times 10^{6}, 7.89525 \times 10^{6}, 9.82446 \times 10^{6}
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