

```
In [57]: import BIDMat.{CMat, CSMat, DMat, Dict, IDict, FMat, FND, GDMat, GMat, GIMat, GSDMat, GSMat, HMat, Image, IMat, Mat, SMat, SBMat, SDMat}
import BIDMat.MatFunctions._
import BIDMat.SciFunctions._
import BIDMat.Solvers._
import BIDMat.JPlotting._
import BIDMach.Learner
import BIDMach.models.{FM, GLM, KMeans, KMeansw, ICA, LDA, LDAGibbs, NMF, RandomForest, SFA}

import BIDMach.datasources.{MatSource, FileSource, SFileSource}

import BIDMach.datasources
import BIDMach.mixins.{CosineSim, Perplexity, Top, L1Regularizer, L2Regularizer}
import BIDMach.updaters.{ADAGrad, Batch, BatchNorm, IncMult, IncNorm, Telescoping}
import BIDMach.causal.{IPTW}

//Mat.checkMKL
Mat.checkCUDA
Mat.setInline
if (Mat.hasCUDA > 0) GPUmem
```

4 CUDA devices found, CUDA version 7.0

Out[57]: (0.9620382,4131733504,4294770688)

```
In [58]: resetGPUs
Mat.clearCaches
Mat.useCache=true
```

Out[58]: true

```
In [59]: val a = rand(3000,3000)
```

```
Out[59]:  0.55756    0.90090    0.46945    0.46412    0.025475   0.20398...
0.017221    0.64356    0.66500    0.68367    0.32823    0.30357...
0.35012    0.65763    0.22918    0.0058981  0.50311    0.57976...
0.40512    0.18691    0.84578    0.034934   0.30411    0.28794...
0.61610    0.28637    0.92497    0.20171    0.46453    0.47081...
0.95452    0.59681    0.59887    0.16789    0.24013    0.31332...
0.29694    0.80148    0.84198    0.95210    0.76150    0.19362...
0.23814    0.49265    0.19027    0.65872    0.58837    0.49819...
..          ..          ..          ..          ..          ..
```

```
In [60]: val g = grand(3000,3000)
```

```
Out[60]:  0.88383  0.26560  0.49986  0.71597  0.62592  0.025724  0.38806...
          0.81384  0.54184  0.15330  0.72245  0.19609  0.70428  0.091144...
          0.39205  0.059318  0.23923  0.93956  0.35483  0.83995  0.55238...
          0.11010  0.73845  0.29540  0.080907  0.68035  0.33180  0.52454...
          0.25042  0.30215  0.35114  0.10926  0.82976  0.17569  0.32088...
          0.48823  0.31811  0.67213  0.75039  0.91785  0.074819  0.27715...
          0.70476  0.26599  0.56332  0.37996  0.085683  0.78528  0.30406...
          0.18731  0.29245  0.091842  0.098015  0.27982  0.84661  0.84277...
          ..      ..      ..      ..      ..      ..      ..
```

```
In [61]: flip; val h = g*g; val ff=gflop
```

```
Out[61]: (1200.0,0.045)
```

```
In [62]: flip; h ~ g*g; val ff=gflop
```

```
Out[62]: (1173.9131,0.046)
```

```
In [63]: val c = loadFMat("/data.txt")
         c.size
```

```
Out[63]: 1316571000
```

```
In [64]: 1316571000/500 // Number of Rows = Total elements divided by number of columns
```

```
Out[64]: 2633142
```

```
In [65]: val gc = GMat(c)
```

```
Out[65]: -762.29 -112.02 -229.52  675.42 -209.38 -1186.4 -1991.8 -367.32...
          -645.54 -169.18 -93.350  614.84 -225.49 -1288.1 -1814.1  -491...
          -440.55 -198.56  51.110  606.73 -289.70 -1507.5 -1793.9 -560.44...
          -650.06 -120.31 -50.740  604.57 -215.91 -1213.6 -1691.4 -508.40...
          -602.58 -135.07 -72.950  618.80 -223.50 -1294.6 -1772.9 -507.35...
          -740.40 -195.67 -126.11  609.34 -209.99 -1204.7 -1801.1 -472.93...
          -417.03 -152.50 -69.420  722.76 -284.01 -1512.9 -1984.1 -435.80...
          -543.22 -131.78 -160.27  561.08 -153.30 -1331.0 -1840.3 -421.61...
          ..      ..      ..      ..      ..      ..      ..      ..
```

```
In [66]: val d = c.rowslice(50000,50001)
         val e = d.t
         print(e)
```

```
-399.13
-516.06
 197.30
 527.32
-411.42
-1746.8
-1953.5
-466.16
 ..
```

```
In [70]: println("CPU computation:\n")

for(i <- 0 to 4){
  val time1 = System.nanoTime()
  time {
    val sorted = sortdown2(c*e)
  }
  println((System.nanoTime()-time1)/1000000);
}

println("\n\n\nGPU computation:\n")

for(i <- 0 to 4){
  val time1 = System.nanoTime()
  time {
    val sorted = sortdown2(gc*e)
  }
  println((System.nanoTime()-time1)/1000000);
}
```

CPU computation:

```
time: 338.963416ms
339
time: 320.747892ms
320
time: 327.869191ms
327
time: 338.343897ms
338
time: 384.542059ms
385
```

GPU computation:

```
time: 1251.674415ms
1252
time: 1251.995166ms
1252
time: 1245.072626ms
1245
time: 1244.881169ms
1244
time: 1246.578612ms
1246
```