

```
In [1]: include("/home/nicole/Jupyter/SSBRJ/src/SSBR.jl")
        using SSBR
```

```
In [2]: function getPos(ped,IDs)
        posAi = Array{Int64,1}(size(IDs,1))
        for (i,id) = enumerate(IDs[:,1])
            posAi[i] = ped.idMap[id].seqID
        end
        return posAi
    end
```

```
Out[2]: getPos (generic function with 1 method)
```

```
In [3]: ; cd Data/0.5a0/M/9

        /home/nicole/Jupyter/JG3/Data/0.5a0/M/9
```

```
In [4]: ;ls

        Correlation.G5.M.C*.txt
        Correlation.G5.M.JC*.txt
        G0.Genotype.ID
        G0.ID
        G0.noGenotype.ID
        G1.Genotype.ID
        G1.ID
        G1.noGenotype.ID
        G2.Genotype.ID
        G2.ID
        G2.noGenotype.ID
        G3.Genotype.ID
        G3.ID
        G3.noGenotype.ID
        G4.Genotype.ID
        G4.ID
        G4.noGenotype.ID
        G5.Genotype.ID
        G5.ID
        G5.noGenotype.ID
```

```
In [5]: ;awk '{print $1}' PedAll.txt | sort -b > all.ID
```

```
In [6]: ;awk '{print $1}' MarNF.txt | sort -b > genotype.ID
```

```
In [7]: ;join -v1 all.ID genotype.ID > noGenotype.ID
```

```
In [8]: ;awk '{print $1,$2}' Phe.txt > sim.phenotype
```

```
In [9]: ;awk '{print $1,$3}' PheAll.txt > sim.bv
```

```
In [10]: ; awk 'NR >=1 && NR <=8000 {print $1}' PedAll.txt | sort -b > G0.ID
```

```

In [11]: ; awk 'NR >=8001 && NR <=16000 {print $1}' PedAll.txt | sort -b > G1.ID

In [12]: ; awk 'NR >=16001 && NR <=24000 {print $1}' PedAll.txt | sort -b > G2.ID

In [13]: ; awk 'NR >=24001 && NR <=32000 {print $1}' PedAll.txt | sort -b > G3.ID

In [14]: ; awk 'NR >=32001 && NR <=40000 {print $1}' PedAll.txt | sort -b > G4.ID

In [15]: ; awk 'NR >=40001 && NR <=48000 {print $1}' PedAll.txt | sort -b > G5.ID

In [16]: ;join G0.ID genotype.ID > G0.Genotype.ID

In [17]: ;join G1.ID genotype.ID > G1.Genotype.ID

In [18]: ;join G2.ID genotype.ID > G2.Genotype.ID

In [19]: ;join G3.ID genotype.ID > G3.Genotype.ID

In [20]: ;join G4.ID genotype.ID > G4.Genotype.ID

In [21]: ;join G5.ID genotype.ID > G5.Genotype.ID

In [22]: ;join -v1 G0.ID genotype.ID > G0.noGenotype.ID

In [23]: ;join -v1 G1.ID genotype.ID > G1.noGenotype.ID

In [24]: ;join -v1 G2.ID genotype.ID > G2.noGenotype.ID

In [25]: ;join -v1 G3.ID genotype.ID > G3.noGenotype.ID

In [26]: ;join -v1 G4.ID genotype.ID > G4.noGenotype.ID

In [27]: ;join -v1 G5.ID genotype.ID > G5.noGenotype.ID

In [28]: ;wc G0.Genotype.ID;wc G1.Genotype.ID;wc G2.Genotype.ID;wc G3.Genotype.ID;wc G4.Genotype.ID;wc G5.Genotype.ID
200 200 1200 G0.Genotype.ID
200 200 1200 G1.Genotype.ID
200 200 1200 G2.Genotype.ID
200 200 1200 G3.Genotype.ID
200 200 1200 G4.Genotype.ID
8000 8000 48000 G5.Genotype.ID

```

```
In [29]: ;wc G0.noGenotype.ID;wc G1.noGenotype.ID;wc G2.noGenotype.ID;wc G3.noGenotype.ID
7800 7800 46800 G0.noGenotype.ID
7800 7800 46800 G1.noGenotype.ID
7800 7800 46800 G2.noGenotype.ID
7800 7800 46800 G3.noGenotype.ID
7800 7800 46800 G4.noGenotype.ID
0 0 0 G5.noGenotype.ID
```

```
In [30]: ped,A_Mats,numSSBayes = calc_Ai("PedAll.txt","genotype.ID",calculateInbreedingCoefficients,
nothing
df = read_genotypes("MarNF.txt",numSSBayes)
M_Mats = make_MMats(df,A_Mats,ped); # with M_Mats
y_Vecs = make_yVecs("sim.phenotype",ped,numSSBayes)
J_Vecs = make_JVecs(numSSBayes,A_Mats)
Z_Mats = make_ZMats(ped,y_Vecs,numSSBayes)
X_Mats, W_Mats = make_XWMats(J_Vecs,Z_Mats,M_Mats,numSSBayes) # with X_Mats and W_Mats
nothing
```

```
In [31]: vRes = 0.594
vG = 0.594
nIter = 50000
@time aHat1,alphaHat,betaHat,epsHat =
ssGibbs(M_Mats,y_Vecs,J_Vecs,Z_Mats,X_Mats,W_Mats,A_Mats, numSSBayes,vRes,vG)
nothing

This is iteration 5000
This is iteration 10000
This is iteration 15000
This is iteration 20000
This is iteration 25000
This is iteration 30000
This is iteration 35000
This is iteration 40000
This is iteration 45000
This is iteration 50000
2393.418668 seconds (23.05 G allocations: 724.054 GB, 7.87% gc time)
```

```
In [32]: betaHat
```

```
Out[32]: 2-element Array{Float64,1}:
 1.03319
-0.940293
```

```
In [33]: mu = betaHat[1]
mug = betaHat[2]
```

```
Out[33]: -0.940292688212778
```

```
In [34]: (mu+mug)/2
```

```
Out[34]: 0.04644963025182147
```

```
In [35]: alphaHat
```

```
Out[35]: 150-element Array{Float64,1}:  
  0.158628  
 -0.155169  
  0.0616967  
  0.038294  
  0.0290551  
 -0.0307799  
  0.0783515  
  0.00415331  
  0.0329173  
  0.0634969  
 -0.0607352  
 -0.0489097  
  0.00550587  
  ⋮  
  0.197417  
  0.133955  
  0.0632815  
  0.165605  
  0.0241362  
  0.0158495  
  0.0434905  
 -0.071608  
 -0.025693  
 -0.189056  
 -0.157171  
  0.0112379
```

```
In [36]: writedlm("alphaEstimatesJ",alphaHat)
```

```
In [37]: epsiHat
```

```
Out[37]: 45952-element Array{Float64,1}:
 -0.827385
  0.0788627
  0.380877
 -0.861398
  0.202842
 -0.028323
 -0.517169
 -0.338022
 -0.8168
 -0.781119
  0.113583
 -0.0120041
 -0.192508
  ⋮
  0.413489
  0.126314
  0.552479
  0.329824
  0.237934
 -0.381011
 -0.176929
 -0.081859
  0.0974883
  0.242574
 -0.546521
 -0.0628122
```

```
In [38]: writedlm("epsiEstimatesJ",epsiHat)
```

```
In [39]: using DataFrames
```

```
In [40]: df = readtable("sim.bv", eltypes=[UTF8String, Float64], separator = ' ', header=:ID,
a = Array{Float64,numSSBayes.num_ped}
for (i,ID) in enumerate(df[:,1])
    j = ped.idMap[ID].seqID
    a[j] = df[i,2]
end
```

```
In [41]: IDs = readtable("all.ID", eltypes=[UTF8String], separator = ' ',header=false)
posAi = getPos(ped,IDs)
cor1 = cor(a[posAi],aHat1[posAi])[1,1]
reg1 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - all.ID : correlation = %6.3f\n", cor1 ) # with correlation
@printf("SSBRJC from Gibbs - all.ID : regression of TBV on GEBV = %6.3f\n", reg1)
JCA11 = cor1
```

```
SSBRJC from Gibbs - all.ID : correlation = 0.900
SSBRJC from Gibbs - all.ID : regression of TBV on GEBV = 1.016
```

```
Out[41]: 0.9000970692449982
```

```
In [42]: TBV = a[posAi]
         mean(TBV)
```

```
Out[42]: 2.6163576041666667
```

```
In [43]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[43]: 1.5474304533636885
```

```
In [44]: IDs = readtable("genotype.ID", eltypes =[UTF8String], separator = ' ',header=
         posAi = getPos(ped,IDs)
         cor2 = cor(a[posAi],aHat1[posAi])[1,1]
         reg2 = linreg(aHat1[posAi], a[posAi])[2,1]
         @printf("SSBRJC from Gibbs - genotype.ID : correlation = %6.3f\n", cor2 ) # 1
         @printf("SSBRJC from Gibbs - genotype.ID : regression of TBV on GEBV = %6.3f\n", reg2)
         JCall = cor2
```

```
SSBRJC from Gibbs - genotype.ID : correlation = 0.754
SSBRJC from Gibbs - genotype.ID : regression of TBV on GEBV = 0.916
```

```
Out[44]: 0.7544119766201682
```

```
In [45]: TBV = a[posAi]
         mean(TBV)
```

```
Out[45]: 3.8991563333333334
```

```
In [46]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[46]: 2.675540333100517
```

```
In [47]: IDs = readtable("noGenotype.ID", eltypes =[UTF8String], separator = ' ',header=
         posAi = getPos(ped,IDs)
         cor3 = cor(a[posAi],aHat1[posAi])[1,1]
         reg3 = linreg(aHat1[posAi], a[posAi])[2,1]
         @printf("SSBRJC from Gibbs - noGenotype.ID : correlation = %6.3f\n", cor3 ) ;
         @printf("SSBRJC from Gibbs - noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg3)
         JCall = cor3
```

```
SSBRJC from Gibbs - noGenotype.ID : correlation = 0.876
SSBRJC from Gibbs - noGenotype.ID : regression of TBV on GEBV = 0.978
```

```
Out[47]: 0.8762811812168909
```

```
In [48]: TBV = a[posAi]
         mean(TBV)
```

```
Out[48]: 2.320327128205128
```

```
In [49]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[49]: 1.2870974041936507
```

```
In [50]: IDs = readtable("G0.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor4 = cor(a[posAi],aHat1[posAi])[1,1]
reg4 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G0.ID : correlation = %6.3f\n", cor4 ) # with e
@printf("SSBRJC from Gibbs - G0.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor4
```

```
SSBRJC from Gibbs - G0.ID : correlation = 0.683
SSBRJC from Gibbs - G0.ID : regression of TBV on GEBV = 0.785
```

```
Out[50]: 0.6828558289786526
```

```
In [51]: TBV = a[posAi]
G0TBV=mean(TBV)
```

```
Out[51]: 1.2755743750000004
```

```
In [52]: GEBV = aHat1[posAi]
G0GEBV=mean(GEBV)
```

```
Out[52]: 0.1342406436483071
```

```
In [53]: IDs = readtable("G1.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor4 = cor(a[posAi],aHat1[posAi])[1,1]
reg4 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G1.ID : correlation = %6.3f\n", cor4 ) # with e
@printf("SSBRJC from Gibbs - G1.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor4
```

```
SSBRJC from Gibbs - G1.ID : correlation = 0.763
SSBRJC from Gibbs - G1.ID : regression of TBV on GEBV = 0.997
```

```
Out[53]: 0.7634408969813192
```

```
In [54]: TBV = a[posAi]
G1TBV=mean(TBV)
```

```
Out[54]: 1.7703276250000002
```

```
In [55]: GEBV = aHat1[posAi]
G1GEBV=mean(GEBV)
```

```
Out[55]: 0.8296465418698543
```

```
In [56]: IDs = readtable("G2.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor5 = cor(a[posAi],aHat1[posAi])[1,1]
reg5 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G2.ID : correlation = %6.3f\n", cor5 ) # with e
@printf("SSBRJC from Gibbs - G2.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor5
```

```
SSBRJC from Gibbs - G2.ID : correlation = 0.742
SSBRJC from Gibbs - G2.ID : regression of TBV on GEBV = 1.001
```

```
Out[56]: 0.7423988070611658
```

```
In [57]: TBV = a[posAi]
G2TBV=mean(TBV)
```

```
Out[57]: 2.344312625
```

```
In [58]: GEBV = aHat1[posAi]
G2GEBV=mean(GEBV)
```

```
Out[58]: 1.374496477129273
```

```
In [59]: IDs = readtable("G3.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor6 = cor(a[posAi],aHat1[posAi])[1,1]
reg6 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G3.ID : correlation = %6.3f\n", cor6 ) # with e
@printf("SSBRJC from Gibbs - G3.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor6
```

```
SSBRJC from Gibbs - G3.ID : correlation = 0.765
SSBRJC from Gibbs - G3.ID : regression of TBV on GEBV = 1.068
```

```
Out[59]: 0.7650053236176831
```

```
In [60]: TBV = a[posAi]
G3TBV=mean(TBV)
```

```
Out[60]: 2.8908736250000002
```

```
In [61]: GEBV = aHat1[posAi]
G3GEBV=mean(GEBV)
```

```
Out[61]: 1.8752251370142
```



```
In [62]: IDs = readtable("G4.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor7 = cor(a[posAi],aHat1[posAi])[1,1]
reg7 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G4.ID : correlation = %6.3f\n", cor7 ) # with e
@printf("SSBRJC from Gibbs - G4.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor7
```

```
SSBRJC from Gibbs - G4.ID : correlation = 0.749
SSBRJC from Gibbs - G4.ID : regression of TBV on GEBV = 1.071
```

```
Out[62]: 0.7488127410234175
```

```
In [63]: TBV = a[posAi]
G4TBV=mean(TBV)
```

```
Out[63]: 3.45945825
```

```
In [64]: GEBV = aHat1[posAi]
G4GEBV=mean(GEBV)
```

```
Out[64]: 2.3570352447070313
```

```
In [65]: IDs = readtable("G5.ID", eltypes =[UTF8String], separator = ' ',header=false
posAi = getPos(ped,IDs)
cor8 = cor(a[posAi],aHat1[posAi])[1,1]
reg8 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G5.ID : correlation = %6.3f\n", cor8 ) # with e
@printf("SSBRJC from Gibbs - G5.ID : regression of TBV on GEBV = %6.3f\n", r
JCA11 = cor8
```

```
SSBRJC from Gibbs - G5.ID : correlation = 0.726
SSBRJC from Gibbs - G5.ID : regression of TBV on GEBV = 0.852
```

```
Out[65]: 0.7256030122076325
```

```
In [66]: TBV = a[posAi]
G5TBV=mean(TBV)
```

```
Out[66]: 3.957599125
```

```
In [67]: GEBV = aHat1[posAi]
G5GEBV=mean(GEBV)
```

```
Out[67]: 2.7139386758134645
```

```
In [68]: reg8 = linreg(aHat1[posAi], a[posAi])
```

```
Out[68]: 2-element Array{Float64,1}:
 1.64473
 0.852218
```

```
In [69]: VarGEBV=var(aHat1[posAi])
```

```
Out[69]: 0.37415647473453956
```

```
In [70]: VarTBV=var(a[posAi])
```

```
Out[70]: 0.5161265434921708
```

```
In [71]: Cov=cov(aHat1[posAi], a[posAi])
```

```
Out[71]: 0.3188627643098826
```

```
In [72]: b=Cov/VarGEBV
```

```
Out[72]: 0.852217683887771
```

```
In [73]: IDs = readtable("G0.Genotype.ID", eltypes =[UTF8String], separator = ' ',head=1)
posAi = getPos(ped,IDs)
cor9 = cor(a[posAi],aHat1[posAi])[1,1]
reg9 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G0.Genotype.ID : correlation = %6.3f\n", cor9 )
@printf("SSBRJC from Gibbs - G0.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg9 )
JCA11 = cor9
```

```
SSBRJC from Gibbs - G0.Genotype.ID : correlation = 0.723
```

```
SSBRJC from Gibbs - G0.Genotype.ID : regression of TBV on GEBV = 0.831
```

```
Out[73]: 0.7225132695190145
```

```
In [74]: TBV = a[posAi]
mean(TBV)
```

```
Out[74]: 2.31163
```

```
In [75]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[75]: 1.6968668390608599
```

```
In [76]: IDs = readtable("G1.Genotype.ID", eltypes =[UTF8String], separator = ' ',head=1)
posAi = getPos(ped,IDs)
cor9 = cor(a[posAi],aHat1[posAi])[1,1]
reg9 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G1.Genotype.ID : correlation = %6.3f\n", cor9 )
@printf("SSBRJC from Gibbs - G1.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg9 )
JCA11 = cor9
```

```
SSBRJC from Gibbs - G1.Genotype.ID : correlation = 0.704
```

```
SSBRJC from Gibbs - G1.Genotype.ID : regression of TBV on GEBV = 0.744
```

```
Out[76]: 0.704315062020248
```

```
In [77]: TBV = a[posAi]
mean(TBV)
```

```
Out[77]: 2.9020149999999996
```

```
In [78]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[78]: 1.9922573138121367
```

```
In [79]: IDs = readtable("G2.Genotype.ID", eltypes =[UTF8String], separator = ' ', head=1,
         posAi = getPos(ped,IDs)
         cor10 = cor(a[posAi],aHat1[posAi])[1,1]
         reg10 = linreg(aHat1[posAi], a[posAi])[2,1]
         @printf("SSBRJC from Gibbs - G2.Genotype.ID : correlation = %6.3f\n", cor10)
         @printf("SSBRJC from Gibbs - G2.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg10)
         JCall = cor10
```

```
SSBRJC from Gibbs - G2.Genotype.ID : correlation = 0.733
```

```
SSBRJC from Gibbs - G2.Genotype.ID : regression of TBV on GEBV = 0.832
```

```
Out[79]: 0.7330782320140862
```

```
In [80]: TBV = a[posAi]
         mean(TBV)
```

```
Out[80]: 3.4562049999999997
```

```
In [81]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[81]: 2.382507357496245
```

```
In [82]: IDs = readtable("G3.Genotype.ID", eltypes =[UTF8String], separator = ' ', head=1,
         posAi = getPos(ped,IDs)
         cor11 = cor(a[posAi],aHat1[posAi])[1,1]
         reg11 = linreg(aHat1[posAi], a[posAi])[2,1]
         @printf("SSBRJC from Gibbs - G3.Genotype.ID : correlation = %6.3f\n", cor11)
         @printf("SSBRJC from Gibbs - G3.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg11)
         JCall = cor11
```

```
SSBRJC from Gibbs - G3.Genotype.ID : correlation = 0.706
```

```
SSBRJC from Gibbs - G3.Genotype.ID : regression of TBV on GEBV = 0.890
```

```
Out[82]: 0.7063015244998975
```

```
In [83]: TBV = a[posAi]
         mean(TBV)
```

```
Out[83]: 4.02339
```

```
In [84]: GEBV = aHat1[posAi]
         mean(GEBV)
```

```
Out[84]: 2.7476264516908078
```

```
In [85]: IDs = readtable("G4.Genotype.ID", eltypes =[UTF8String], separator = ' ', head=10)
posAi = getPos(ped,IDs)
cor12 = cor(a[posAi],aHat1[posAi])[1,1]
reg12 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G4.Genotype.ID : correlation = %6.3f\n", cor12)
@printf("SSBRJC from Gibbs - G4.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg12)
JCall = cor12
```

```
SSBRJC from Gibbs - G4.Genotype.ID : correlation = 0.692
SSBRJC from Gibbs - G4.Genotype.ID : regression of TBV on GEBV = 0.726
```

```
Out[85]: 0.6918805835172364
```

```
In [86]: TBV = a[posAi]
mean(TBV)
```

```
Out[86]: 4.46483
```

```
In [87]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[87]: 3.0225099949246608
```

```
In [88]: IDs = readtable("G5.Genotype.ID", eltypes =[UTF8String], separator = ' ', head=10)
posAi = getPos(ped,IDs)
cor13 = cor(a[posAi],aHat1[posAi])[1,1]
reg13 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G5.Genotype.ID : correlation = %6.3f\n", cor13)
@printf("SSBRJC from Gibbs - G5.Genotype.ID : regression of TBV on GEBV = %6.3f\n", reg13)
JCall = cor13
```

```
SSBRJC from Gibbs - G5.Genotype.ID : correlation = 0.726
SSBRJC from Gibbs - G5.Genotype.ID : regression of TBV on GEBV = 0.852
```

```
Out[88]: 0.7256030122076325
```

```
In [89]: writedlm("Correlation.G5.M.J.txt",cor13)
```

```
In [90]: writedlm("Regression.G5.M.J.txt",reg13)
```

```
In [91]: TBVG5Gall = a[posAi]
TBVG5G=mean(TBVG5Gall)
```

```
Out[91]: 3.957599125
```

```
In [92]: GEBVG5Gall = aHat1[posAi]
GEBVG5G=mean(GEBVG5Gall)
```

```
Out[92]: 2.7139386758134645
```

```
In [93]: IDs = readtable("G0.noGenotype.ID", eltypes =[UTF8String], separator = ' ', header = 1,
posAi = getPos(ped,IDs)
cor14 = cor(a[posAi],aHat1[posAi])[1,1]
reg14 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G0.noGenotype.ID : correlation = %6.3f\n", cor14)
@printf("SSBRJC from Gibbs - G0.noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg14)
JCall = cor14
```

```
SSBRJC from Gibbs - G0.noGenotype.ID : correlation = 0.664
SSBRJC from Gibbs - G0.noGenotype.ID : regression of TBV on GEBV = 0.804
```

```
Out[93]: 0.6640113727463848
```

```
In [94]: TBV = a[posAi]
mean(TBV)
```

```
Out[94]: 1.2490088461538464
```

```
In [95]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[95]: 0.0941733053043955
```

```
In [96]: IDs = readtable("G1.noGenotype.ID", eltypes =[UTF8String], separator = ' ', header = 1,
posAi = getPos(ped,IDs)
cor14 = cor(a[posAi],aHat1[posAi])[1,1]
reg14 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G1.noGenotype.ID : correlation = %6.3f\n", cor14)
@printf("SSBRJC from Gibbs - G1.noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg14)
JCall = cor14
```

```
SSBRJC from Gibbs - G1.noGenotype.ID : correlation = 0.748
SSBRJC from Gibbs - G1.noGenotype.ID : regression of TBV on GEBV = 1.006
```

```
Out[96]: 0.7481312476731397
```

```
In [97]: TBV = a[posAi]
mean(TBV)
```

```
Out[97]: 1.7413100000000001
```

```
In [98]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[98]: 0.7998360092559497
```

```
In [99]: IDs = readtable("G2.noGenotype.ID", eltypes =[UTF8String], separator = ' ', header = 1,
posAi = getPos(ped,IDs)
cor15 = cor(a[posAi],aHat1[posAi])[1,1]
reg15 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G2.noGenotype.ID : correlation = %6.3f\n", cor15)
@printf("SSBRJC from Gibbs - G2.noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg15)
JCall = cor15
```

```
SSBRJC from Gibbs - G2.noGenotype.ID : correlation = 0.724
SSBRJC from Gibbs - G2.noGenotype.ID : regression of TBV on GEBV = 0.995
```

```
Out[99]: 0.7239489063148363
```

```
In [100]: TBV = a[posAi]
mean(TBV)
```

```
Out[100]: 2.3158025641025644
```

```
In [101]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[101]: 1.3486500442993505
```

```
In [102]: IDs = readtable("G3.noGenotype.ID", eltypes =[UTF8String], separator = ' ', header = 1,
posAi = getPos(ped,IDs)
cor16 = cor(a[posAi],aHat1[posAi])[1,1]
reg16 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G3.noGenotype.ID : correlation = %6.3f\n", cor16)
@printf("SSBRJC from Gibbs - G3.noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg16)
JCall = cor16
```

```
SSBRJC from Gibbs - G3.noGenotype.ID : correlation = 0.750
SSBRJC from Gibbs - G3.noGenotype.ID : regression of TBV on GEBV = 1.055
```

```
Out[102]: 0.7502606778485269
```

```
In [103]: TBV = a[posAi]
mean(TBV)
```

```
Out[103]: 2.861834743589743
```

```
In [104]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[104]: 1.8528558725353124
```

```
In [105]: IDs = readtable("G4.noGenotype.ID", eltypes =[UTF8String], separator = ' ', header = 1,
posAi = getPos(ped,IDs)
cor17 = cor(a[posAi],aHat1[posAi])[1,1]
reg17 = linreg(aHat1[posAi], a[posAi])[2,1]
@printf("SSBRJC from Gibbs - G4.noGenotype.ID : correlation = %6.3f\n", cor17)
@printf("SSBRJC from Gibbs - G4.noGenotype.ID : regression of TBV on GEBV = %6.3f\n", reg17)
JCA11 = cor17
```

```
SSBRJC from Gibbs - G4.noGenotype.ID : correlation = 0.739
SSBRJC from Gibbs - G4.noGenotype.ID : regression of TBV on GEBV = 1.060
```

```
Out[105]: 0.7386495793850711
```

```
In [106]: TBV = a[posAi]
mean(TBV)
```

```
Out[106]: 3.4336794871794876
```

```
In [107]: GEBV = aHat1[posAi]
mean(GEBV)
```

```
Out[107]: 2.3399717895732457
```

```
In [108]: numSSBayes
```

```
Out[108]: SSBR.NumSSBayes(54952,45952,9000,40000,39000,1000,150)
```

```
In [109]: J_Vecs.J1
```

```
Out[109]: 45952x1 Array{Float64,2}:
-0.00116447
-0.0011716
-0.0531349
-0.92507
-0.504098
-0.00117027
-0.752345
-0.754804
-0.752447
-0.00116885
-0.751757
-0.962656
-0.502046
⋮
-0.943537
-0.962602
6.52184e-51
-0.756583
-0.834464
-0.757885
-1.44332e-35
-0.962646
-0.557096
-0.887734
-0.878291
0.0
```

```
In [110]: sortrows(J_Vecs.J1[end-8000:end,:])
```

```
Out[110]: 8001x1 Array{Float64,2}:  
  -0.984277  
  -0.983115  
  -0.982549  
  -0.981251  
  -0.981224  
  -0.981202  
  -0.981184  
  -0.981162  
  -0.980923  
  -0.98078  
  -0.980257  
  -0.979199  
  -0.979048  
  ⋮  
  5.56173e-17  
  5.56411e-17  
  5.56418e-17  
  5.57135e-17  
  5.57137e-17  
  5.57225e-17  
  5.57596e-17  
  5.5771e-17  
  5.57763e-17  
  5.60474e-17  
  5.89245e-17  
  6.62078e-17
```



```
In [111]: J1 = sortrows(J_Vecs.J1)
```

```
Out[111]: 45952x1 Array{Float64,2}:  
  -0.990695  
  -0.989627  
  -0.98856  
  -0.987282  
  -0.986838  
  -0.986618  
  -0.985845  
  -0.985691  
  -0.985294  
  -0.985181  
  -0.984314  
  -0.984291  
  -0.984284  
  ⋮  
  6.2152e-17  
  6.61199e-17  
  6.62078e-17  
  6.6239e-17  
  6.6298e-17  
  7.73019e-17  
  8.48542e-17  
  8.90409e-17  
  9.1296e-17  
  1.11169e-16  
  1.11682e-16  
  1.24304e-16
```

```
In [112]: J1[J1 .< 0.0,:]
```

```
Out[112]: 44004x1 Array{Float64,2}:  
  -0.990695  
  -0.989627  
  -0.98856  
  -0.987282  
  -0.986838  
  -0.986618  
  -0.985845  
  -0.985691  
  -0.985294  
  -0.985181  
  -0.984314  
  -0.984291  
  -0.984284  
  ⋮  
  -7.2166e-36  
  -7.20816e-36  
  -7.08362e-36  
  -8.72921e-51  
  -8.37556e-65  
  -4.18778e-65  
  -5.45572e-67  
  -3.55598e-67  
  -3.11422e-67  
  -1.77903e-67  
  -1.77799e-67  
  -1.03237e-96
```

```
In [113]: J1[J1 .> 0.0,:]
```

```
Out[113]: 1279x1 Array{Float64,2}:
 4.64937e-81
 9.29874e-81
 8.01204e-52
 8.01675e-52
 1.40252e-51
 1.57288e-51
 1.60053e-51
 1.60147e-51
 1.60241e-51
 1.60241e-51
 1.60241e-51
 1.60241e-51
 1.60241e-51
 1.60335e-51
 ⋮
 6.2152e-17
 6.61199e-17
 6.62078e-17
 6.6239e-17
 6.6298e-17
 7.73019e-17
 8.48542e-17
 8.90409e-17
 9.1296e-17
 1.11169e-16
 1.11682e-16
 1.24304e-16
```

```
In [114]: G = convert(Array,readtable("MarNF.txt", separator = ' ',header=false));
```

```
In [115]: GAll=mean(G[:,2:end],1)
```

```
Out[115]: 1x150 Array{Float64,2}:
 1.91389  1.29211  0.224556  0.525333  1.55233  ...  0.730333  1.60711  1.2
2567
```

```
In [116]: GG0=mean(G[1:200,2:end],1)
```

```
Out[116]: 1x150 Array{Float64,2}:
 1.865  1.49  0.27  0.645  1.435  0.565  ...  0.665  0.67  0.745  1.725  1.
115
```

```
In [117]: GG1=mean(G[201:400,2:end],1)
```

```
Out[117]: 1x150 Array{Float64,2}:
 1.875  1.46  0.24  0.61  1.47  0.53  ...  0.39  0.66  0.665  0.765  1.7
1.09
```

```
In [118]: GG2=mean(G[401:600,2:end],1)
```

```
Out[118]: 1x150 Array{Float64,2}:
 1.93  1.37  0.19  0.505  1.56  0.44  ...  0.33  0.62  0.63  0.725  1.67
1.1
```

```
In [119]: GG3=mean(G[601:800,2:end],1)
```

```
Out[119]: 1x150 Array{Float64,2}:  
 1.925  1.285  0.245  0.53  1.54  0.46  ...  0.515  0.52  0.73  1.63  1.23
```

```
In [120]: GG4=mean(G[801:1000,2:end],1)
```

```
Out[120]: 1x150 Array{Float64,2}:  
 1.915  1.225  0.225  0.51  1.57  0.43  ...  0.37  0.5  0.51  0.7  1.55  1.  
28
```

```
In [121]: GG5=mean(G[1001:9000,2:end],1)
```

```
Out[121]: 1x150 Array{Float64,2}:  
 1.91538  1.28287  0.223375  0.521  1.557  ...  0.537  0.73  1.60113  1.233  
5
```

```
In [122]: writedlm("meanOfSNPMAll",GAll)
```

```
In [123]: writedlm("meanOfSNPMG0",GG0)
```

```
In [124]: writedlm("meanOfSNPMG1",GG1)
```

```
In [125]: writedlm("meanOfSNPMG2",GG2)
```

```
In [126]: writedlm("meanOfSNPMG3",GG3)
```

```
In [127]: writedlm("meanOfSNPMG4",GG4)
```

```
In [128]: writedlm("meanOfSNPMG5",GG5)
```