

```
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/7  
  
/home/nicole/Jupyter/JG3/Data/0.5a0/M/7
```

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
MarNF.txt
MarNFCenter.txt
PedAll.txt
Phe.txt
PheAll.txt
Regression.G5.M.C*.txt
Regression.G5.M.JC*.txt
all.ID
alphaEstimatesLeggaraC
alphaEstimatesLeggaraJC
epsiEstimatesLeggaraC
epsiEstimatesLeggaraJC
genotype.ID
noGenotype.ID
sim.bv
sim.phenotype
```

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 (
          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
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",calculateInbreeding
nothing
df      = read_genotypes("MarNF.txt",numSSBayes)
M_Mats = make_MMats(df,A_Mats,ped);           # with
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
nothing
```

```
In [31]: vRes      = 0.738
vG       = 0.738
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
2393.745215 seconds (23.01 G allocations: 723.131 GB, 7.75% gc time)
```

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

```
Out[32]: 2-element Array{Float64,1}:
 1.0022
-0.681803
```

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

```
Out[33]: -0.6818034307694358
```

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

```
Out[34]: 0.16019794618173533
```

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

```
Out[35]: 150-element Array{Float64,1}:  
  0.0165386  
  0.0635985  
 -0.126828  
 -0.00466644  
  0.0426962  
 -0.202981  
 -0.0258997  
  0.00870283  
  0.0622518  
  0.134859  
 -0.065134  
 -0.158718  
  0.104839  
  ⋮  
  0.0830069  
  0.0259251  
 -0.12093  
  0.0184763  
  0.0253866  
 -0.0100977  
  0.0586621  
  0.0339816  
  0.0118094  
 -0.0653356  
  0.0620544  
  0.116005
```

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

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

```
Out[37]: 45885-element Array{Float64,1}:
 -0.576515
 -0.336363
  0.312782
  0.390208
 -0.471316
  0.599357
 -0.803525
 -0.27723
 -0.265049
 -0.286817
 -0.403366
 -0.0840698
 -0.831475
  ⋮
  0.252957
 -0.208824
  0.223268
  0.298306
  0.0651728
 -0.692386
 -0.279559
  0.0364881
 -0.532748
 -0.241106
  0.202974
  0.513036
```

```
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 = 0.901
SSBRJC from Gibbs - all.ID : regression of TBV on GEBV = 1.002
```

```
Out[41]: 0.900814097860042
```

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

```
Out[42]: 2.6270850208333334
```

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

```
Out[43]: 1.6011037707643558
```

```
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 = 0.809
SSBRJC from Gibbs - genotype.ID : regression of TBV on GEBV = 0.998
```

```
Out[44]: 0.8092211963305848
```

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

```
Out[45]: 3.8989498888888887
```

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

```
Out[46]: 2.7634902843474
```

```
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 = 0.873
SSBRJC from Gibbs - noGenotype.ID : regression of TBV on GEBV = 0.967
```

```
Out[47]: 0.8731530494731647
```

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

```
Out[48]: 2.3335777435897436
```

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

```
Out[49]: 1.332860729168269
```

```
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 =  0.715
SSBRJC from Gibbs - G0.ID : regression of TBV on GEBV =  0.862
```

```
Out[50]: 0.7145280212831276
```

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

```
Out[51]: 1.242720875
```

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

```
Out[52]: 0.13349227512914336
```

```
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 =  0.758
SSBRJC from Gibbs - G1.ID : regression of TBV on GEBV =  0.970
```

```
Out[53]: 0.7578244761247127
```

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

```
Out[54]: 1.806066625
```

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

```
Out[55]: 0.8628586429619325
```



```
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 = 0.757
SSBRJC from Gibbs - G2.ID : regression of TBV on GEBV = 1.017
```

```
Out[56]: 0.7571246661188465
```

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

```
Out[57]: 2.3675376249999998
```

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

```
Out[58]: 1.4348230296405067
```

```
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 = 0.757
SSBRJC from Gibbs - G3.ID : regression of TBV on GEBV = 1.013
```

```
Out[59]: 0.756786418330833
```

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

```
Out[60]: 2.9335720000000003
```

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

```
Out[61]: 1.9600281971790816
```

```
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
JCall = cor7
```

```
SSBRJC from Gibbs - G4.ID : correlation = 0.726
SSBRJC from Gibbs - G4.ID : regression of TBV on GEBV = 1.006
```

```
Out[62]: 0.7259773588481732
```

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

```
Out[63]: 3.4565102499999996
```

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

```
Out[64]: 2.413208098922522
```

```
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
JCall = cor8
```

```
SSBRJC from Gibbs - G5.ID : correlation = 0.786
SSBRJC from Gibbs - G5.ID : regression of TBV on GEBV = 0.952
```

```
Out[65]: 0.7857868778250098
```

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

```
Out[66]: 3.9561027499999994
```

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

```
Out[67]: 2.8022123807529487
```

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

```
Out[68]: 2-element Array{Float64,1}:
 1.28883
 0.951845
```

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

```
Out[69]: 0.36799445244605267
```

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

```
Out[70]: 0.5399637294086136
```

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

```
Out[71]: 0.3502738388325137
```

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

```
Out[72]: 0.9518454327347862
```

```
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 = 0.826
```

```
SSBRJC from Gibbs - G0.Genotype.ID : regression of TBV on GEBV = 0.955
```

```
Out[73]: 0.8259404549514152
```

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

```
Out[74]: 2.353905
```

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

```
Out[75]: 1.7123655549686374
```

```
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 = 0.758
```

```
SSBRJC from Gibbs - G1.Genotype.ID : regression of TBV on GEBV = 0.902
```

```
Out[76]: 0.758082798425254
```

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

```
Out[77]: 2.9259999999999997
```

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

```
Out[78]: 2.0953256281266848
```

```
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 = 0.815
```

```
SSBRJC from Gibbs - G2.Genotype.ID : regression of TBV on GEBV = 0.843
```

```
Out[79]: 0.8154187764265639
```

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

```
Out[80]: 3.5142349999999998
```

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

```
Out[81]: 2.5041110936417943
```

```
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 = 0.707
```

```
SSBRJC from Gibbs - G3.Genotype.ID : regression of TBV on GEBV = 0.751
```

```
Out[82]: 0.7065518931394998
```

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

```
Out[83]: 3.953035
```

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

```
Out[84]: 2.8124285669555626
```

```
In [85]: IDs = readtable("G4.Genotype.ID", eltypes =[UTF8String], separator = ' ',head=1)
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 = 0.753
```

```
SSBRJC from Gibbs - G4.Genotype.ID : regression of TBV on GEBV = 0.867
```

```
Out[85]: 0.75274454585002
```

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

```
Out[86]: 4.46146
```

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

```
Out[87]: 3.14433672182236
```

```
In [88]: IDs = readtable("G5.Genotype.ID", eltypes =[UTF8String], separator = ' ',head=1)
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 = 0.786
```

```
SSBRJC from Gibbs - G5.Genotype.ID : regression of TBV on GEBV = 0.952
```

```
Out[88]: 0.7857868778250098
```

```
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]: 3.9561027499999994
```

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

```
Out[92]: 2.8022123807529487
```

```
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 = 0.699
SSBRJC from Gibbs - G0.noGenotype.ID : regression of TBV on GEBV = 0.883
```

```
Out[93]: 0.6987062266218304
```

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

```
Out[94]: 1.2142289743589743
```

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

```
Out[95]: 0.09300834487684866
```

```
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 = 0.743
SSBRJC from Gibbs - G1.noGenotype.ID : regression of TBV on GEBV = 0.979
```

```
Out[96]: 0.7430716773039239
```

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

```
Out[97]: 1.7773503846153844
```

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

```
Out[98]: 0.8312569253936055
```

```
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 = 0.740
SSBRJC from Gibbs - G2.noGenotype.ID : regression of TBV on GEBV = 1.017
```

```
Out[99]: 0.740092201351663
```

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

```
Out[100]: 2.338135128205128
```

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

```
Out[101]: 1.4074053869738072
```

```
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 = 0.745
SSBRJC from Gibbs - G3.noGenotype.ID : regression of TBV on GEBV = 1.007
```

```
Out[102]: 0.7450159283194185
```

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

```
Out[103]: 2.907431923076923
```

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

```
Out[104]: 1.9381717774412233
```

```
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)
JCall = cor17
```

```
SSBRJC from Gibbs - G4.noGenotype.ID : correlation = 0.712
SSBRJC from Gibbs - G4.noGenotype.ID : regression of TBV on GEBV = 0.991
```

```
Out[105]: 0.711766544171867
```

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

```
Out[106]: 3.4307423076923076
```

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

```
Out[107]: 2.3944612111558596
```

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

```
Out[108]: SSBR.NumSSBayes(54885,45885,9000,40000,39000,1000,150)
```

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

```
Out[109]: 45885x1 Array{Float64,2}:
-0.166518
-0.0015779
-0.00117302
-0.924647
-0.503804
-0.502046
-0.00116954
-0.813923
-0.751899
-0.751902
-0.026875
-0.971965
-0.548897
⋮
-0.972696
-0.00116959
-0.756478
-0.751906
-0.753278
-0.00231669
-0.965455
-0.507176
-0.888786
-0.878366
-0.00224735
-0.0011811
```



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

```
Out[110]: 8001x1 Array{Float64,2}:  
  -0.988862  
  -0.985588  
  -0.981364  
  -0.981296  
  -0.981241  
  -0.981142  
  -0.980905  
  -0.980877  
  -0.980876  
  -0.980855  
  -0.980791  
  -0.980502  
  -0.979913  
  ⋮  
  5.54868e-17  
  5.54896e-17  
  5.55601e-17  
  5.56092e-17  
  5.56329e-17  
  5.56412e-17  
  5.56735e-17  
  5.56903e-17  
  5.57142e-17  
  5.63755e-17  
  5.66456e-17  
  1.001e-16
```

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

```
Out[111]: 45885x1 Array{Float64,2}:  
  -0.990515  
  -0.988862  
  -0.986904  
  -0.985937  
  -0.985772  
  -0.98563  
  -0.985588  
  -0.985585  
  -0.985577  
  -0.985568  
  -0.985522  
  -0.985411  
  -0.985291  
  ⋮  
  6.28015e-17  
  6.28015e-17  
  6.66725e-17  
  7.05189e-17  
  7.40958e-17  
  7.41458e-17  
  7.43712e-17  
  7.70326e-17  
  8.89475e-17  
  1.001e-16  
  1.0697e-16  
  1.11088e-16
```

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

```
Out[112]: 43889x1 Array{Float64,2}:  
  -0.990515  
  -0.988862  
  -0.986904  
  -0.985937  
  -0.985772  
  -0.98563  
  -0.985588  
  -0.985585  
  -0.985577  
  -0.985568  
  -0.985522  
  -0.985411  
  -0.985291  
  ⋮  
 -1.25934e-35  
 -1.15288e-35  
 -7.22719e-36  
 -7.21871e-36  
 -7.2166e-36  
 -7.2166e-36  
 -2.59644e-65  
 -7.1781e-66  
 -2.56107e-66  
 -3.40781e-67  
 -1.77903e-67  
 -8.89515e-68
```

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

```
Out[113]: 1241x1 Array{Float64,2}:
 1.97512e-83
 8.01203e-52
 1.53474e-51
 1.60241e-51
 1.60288e-51
 1.60476e-51
 2.5599e-51
 3.06949e-51
 3.20571e-51
 4.91957e-51
 9.69951e-51
 1.1534e-50
 2.30681e-50
 ⋮
 6.28015e-17
 6.28015e-17
 6.66725e-17
 7.05189e-17
 7.40958e-17
 7.41458e-17
 7.43712e-17
 7.70326e-17
 8.89475e-17
 1.001e-16
 1.0697e-16
 1.11088e-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}:
 0.151556  1.90956  0.253778  1.81044  ...  1.30256  0.860444  1.84244  1.4
6089
```

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

```
Out[116]: 1x150 Array{Float64,2}:
 0.11  1.795  0.405  1.77  0.22  0.39  ...  1.33  1.11  1.385  0.82  1.83
1.18
```

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

```
Out[117]: 1x150 Array{Float64,2}:
 0.11  1.855  0.38  1.74  0.18  0.315  ...  0.985  1.34  0.86  1.835  1.355
```

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

```
Out[118]: 1x150 Array{Float64,2}:
 0.135  1.91  0.325  1.755  0.14  0.26  ...  0.95  1.355  0.795  1.865  1.3
9
```

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

```
Out[119]: 1x150 Array{Float64,2}:  
 0.17  1.9  0.24  1.83  0.11  0.215  ...  0.895  1.335  0.805  1.885  1.445
```

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

```
Out[120]: 1x150 Array{Float64,2}:  
 0.15  1.95  0.205  1.825  0.085  0.15  ...  0.835  1.27  0.88  1.825  1.54
```

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

```
Out[121]: 1x150 Array{Float64,2}:  
 0.153625  1.913  0.246625  1.81375  ...  1.29825  0.864  1.84175  1.47075
```

```
In [122]: writedlm("meanOfSNPMA11",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)
```