

```
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/0.5/M/6

/home/nicole/Jupyter/JG3/Data/0.5/M/6
```

```
In [4]: ;ls

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
PedAll.txt
Phe.txt
PheAll.txt
Regression.G5.M.JC.txt
all.ID
alphaEstimatesJC
epsiEstimatesJC
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 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;wc G4.noGenotype.ID;wc G5.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 = 0.912
vG = 0.912
nIter = 50000
@time aHat1,alphaHat,betaHat,epsiHat =
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
2433.005240 seconds (23.03 G allocations: 723.530 GB, 7.67% gc time)
```

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

```
Out[32]: 2-element Array{Float64,1}:
 8.45617
-0.190713
```

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

```
Out[33]: -0.190713338742804
```

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

```
Out[34]: 4.132727320231116
```

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

```
Out[35]: 150-element Array{Float64,1}:
```

```
-0.110461
-0.110717
 0.0744695
-0.0327625
 0.224178
-0.173618
 0.183525
 0.0216688
-0.0452419
 0.0144458
 0.0383984
-0.193204
-0.122949
  ⋮
-0.325554
 0.0836221
 0.289464
-0.00834005
-0.0506397
 0.139301
-0.0220135
 0.000787494
 0.00502778
 0.113128
-0.112901
-0.105884
```

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

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

```
Out[37]: 45914-element Array{Float64,1}:
 0.744214
-0.301736
 0.0192847
-0.698152
 0.267603
-0.489449
-0.640107
-0.428561
-0.342699
-0.127465
-0.113584
-0.145319
-0.80432
  ⋮
 0.683192
-1.07023
 0.700766
-0.170436
-0.852642
 0.73588
-0.430786
-0.599354
-0.654311
 0.584568
-0.104601
 0.806343
```

```
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=:ID,
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",
JCA11 = cor1
```

```
SSBRJC from Gibbs - all.ID : correlation = 0.902
SSBRJC from Gibbs - all.ID : regression of TBV on GEBV = 0.992
```

```
Out[41]: 0.9022329547906212
```

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

```
Out[42]: 10.199740145833333
```

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

```
Out[43]: 1.7365396434489158
```

```
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 = %6.3:
         JCA11 = cor2
```

```
SSBRJC from Gibbs - genotype.ID : correlation =  0.831
SSBRJC from Gibbs - genotype.ID : regression of TBV on GEBV =  0.972
```

```
Out[44]: 0.8313162956992592
```

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

```
Out[45]: 11.505419444444444
```

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

```
Out[46]: 2.996790181661956
```

```
In [47]: IDs = readtable("noGenotype.ID", eltypes =[UTF8String], separator = ' ',head
         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
         JCA11 = cor3
```

```
SSBRJC from Gibbs - noGenotype.ID : correlation =  0.874
SSBRJC from Gibbs - noGenotype.ID : regression of TBV on GEBV =  0.976
```

```
Out[47]: 0.8742700674261374
```

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

```
Out[48]: 9.898429538461539
```

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

```
Out[49]: 1.4457125961689838
```

```
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 = 0.730
SSBRJC from Gibbs - G0.ID : regression of TBV on GEBV = 0.931
```

```
Out[50]: 0.7296969536856135
```

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

```
Out[51]: 8.683999375
```

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

```
Out[52]: 0.15153367149854063
```

```
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 = 0.761
SSBRJC from Gibbs - G1.ID : regression of TBV on GEBV = 0.990
```

```
Out[53]: 0.7606350598832877
```

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

```
Out[54]: 9.382714874999998
```

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

```
Out[55]: 0.9664251773798255
```

```
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 = 0.762
SSBRJC from Gibbs - G2.ID : regression of TBV on GEBV = 1.003
```

```
Out[56]: 0.7619094550352716
```

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

```
Out[57]: 9.982135999999997
```

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

```
Out[58]: 1.5743648305004954
```

```
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 = 0.750
SSBRJC from Gibbs - G3.ID : regression of TBV on GEBV = 1.000
```

```
Out[59]: 0.7499001838084868
```

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

```
Out[60]: 10.526489125
```

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

```
Out[61]: 2.092502288882835
```



```
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 = 0.744
SSBRJC from Gibbs - G4.ID : regression of TBV on GEBV = 0.984
```

```
Out[62]: 0.7441962724071378
```

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

```
Out[63]: 11.062736000000001
```

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

```
Out[64]: 2.5943297884095027
```

```
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 = 0.809
SSBRJC from Gibbs - G5.ID : regression of TBV on GEBV = 0.937
```

```
Out[65]: 0.8090585046156837
```

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

```
Out[66]: 11.560365500000001
```

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

```
Out[67]: 3.040082104022296
```

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

```
Out[68]: 2-element Array{Float64,1}:
 8.71033
 0.937485
```

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

```
Out[69]: 0.4149416510922003
```

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

```
Out[70]: 0.5571294135864484
```

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

```
Out[71]: 0.3890016886463161
```

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

```
Out[72]: 0.9374852768392722
```

```
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 = 0.844
```

```
SSBRJC from Gibbs - G0.Genotype.ID : regression of TBV on GEBV = 1.003
```

```
Out[73]: 0.8441199519789219
```

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

```
Out[74]: 10.039674999999999
```

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

```
Out[75]: 1.8692426855932263
```

```
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 = 0.835
```

```
SSBRJC from Gibbs - G1.Genotype.ID : regression of TBV on GEBV = 0.931
```

```
Out[76]: 0.8346333647271073
```

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

```
Out[77]: 10.57286
```

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

```
Out[78]: 2.2530958730862665
```

```
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 = 0.825
```

```
SSBRJC from Gibbs - G2.Genotype.ID : regression of TBV on GEBV = 0.943
```

```
Out[79]: 0.8248714503621519
```

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

```
Out[80]: 11.076469999999999
```

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

```
Out[81]: 2.63887198445509
```

```
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 = 0.792
```

```
SSBRJC from Gibbs - G3.Genotype.ID : regression of TBV on GEBV = 0.821
```

```
Out[82]: 0.791619957119714
```

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

```
Out[83]: 11.597399999999999
```

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

```
Out[84]: 3.077870109969571
```

```
In [85]: IDs = readtable("G4.Genotype.ID", eltypes =[UTF8String], separator = ' ',head
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
JCall = cor12
```

```
SSBRJC from Gibbs - G4.Genotype.ID : correlation = 0.746
```

```
SSBRJC from Gibbs - G4.Genotype.ID : regression of TBV on GEBV = 0.785
```

```
Out[85]: 0.7462287020482886
```

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

```
Out[86]: 12.042850000000001
```

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

```
Out[87]: 3.4131933607920346
```

```
In [88]: IDs = readtable("G5.Genotype.ID", eltypes =[UTF8String], separator = ' ',head
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
JCall = cor13
```

```
SSBRJC from Gibbs - G5.Genotype.ID : correlation = 0.809
```

```
SSBRJC from Gibbs - G5.Genotype.ID : regression of TBV on GEBV = 0.937
```

```
Out[88]: 0.8090585046156837
```

```
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]: 11.560365500000001
```

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

```
Out[92]: 3.040082104022296
```

```
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 = 0.711
SSBRJC from Gibbs - G0.noGenotype.ID : regression of TBV on GEBV = 0.952
```

```
Out[93]: 0.7112394934007845
```

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

```
Out[94]: 8.649238461538461
```

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

```
Out[95]: 0.10748985062431794
```

```
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 = 0.746
SSBRJC from Gibbs - G1.noGenotype.ID : regression of TBV on GEBV = 0.998
```

```
Out[96]: 0.7456943226432794
```

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

```
Out[97]: 9.352198333333334
```

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

```
Out[98]: 0.9334336210796605
```

```
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 = 0.749
SSBRJC from Gibbs - G2.noGenotype.ID : regression of TBV on GEBV = 1.002
```

```
Out[99]: 0.7489033711558303
```

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

```
Out[100]: 9.954076153846152
```

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

```
Out[101]: 1.5470697752708904
```

```
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 = 0.737
SSBRJC from Gibbs - G3.noGenotype.ID : regression of TBV on GEBV = 0.998
```

```
Out[102]: 0.7368972366433835
```

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

```
Out[103]: 10.499029871794875
```

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

```
Out[104]: 2.0672364473165086
```

```
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 = 0.733
SSBRJC from Gibbs - G4.noGenotype.ID : regression of TBV on GEBV = 0.978
```

```
Out[105]: 0.7327735704710241
```

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

```
Out[106]: 11.037604871794871
```

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

```
Out[107]: 2.5733332865535403
```

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

```
Out[108]: SSBR.NumSSBayes(54914,45914,9000,40000,39000,1000,150)
```

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

```
Out[109]: 45914x1 Array{Float64,2}:
-0.00117028
 3.92504e-19
-0.892887
-0.638644
-0.501464
-0.00233918
-0.752192
-0.801493
-0.752203
-0.49978
-0.751756
-0.963442
-0.501755
⋮
-0.000584886
-0.878612
-0.943892
-0.963116
-0.756583
-0.773225
-0.752217
-0.962421
-0.879166
-0.504676
-0.888278
-0.047142
```

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

```
Out[110]: 8001x1 Array{Float64,2}:  
  -0.988323  
  -0.98701  
  -0.986162  
  -0.984398  
  -0.983866  
  -0.983365  
  -0.982663  
  -0.982515  
  -0.982485  
  -0.982368  
  -0.981768  
  -0.981726  
  -0.981316  
  ⋮  
  5.60471e-17  
  5.60822e-17  
  5.62715e-17  
  5.63274e-17  
  5.68738e-17  
  5.69477e-17  
  5.77249e-17  
  5.83554e-17  
  6.0816e-17  
  6.10027e-17  
  6.60571e-17  
  7.00697e-17
```



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

```
Out[111]: 45914x1 Array{Float64,2}:  
  -0.988953  
  -0.988323  
  -0.98701  
  -0.986736  
  -0.986206  
  -0.986162  
  -0.985593  
  -0.985589  
  -0.985292  
  -0.985236  
  -0.984509  
  -0.98444  
  -0.984398  
  ⋮  
  6.6665e-17  
  6.70766e-17  
  6.96733e-17  
  7.00697e-17  
  7.07202e-17  
  7.36787e-17  
  7.40941e-17  
  7.48391e-17  
  7.94004e-17  
  7.96053e-17  
  9.57602e-17  
  1.11476e-16
```

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

```
Out[112]: 43909x1 Array{Float64,2}:  
  -0.988953  
  -0.988323  
  -0.98701  
  -0.986736  
  -0.986206  
  -0.986162  
  -0.985593  
  -0.985589  
  -0.985292  
  -0.985236  
  -0.984509  
  -0.98444  
  -0.984398  
  ⋮  
  -7.25056e-36  
  -7.23354e-36  
  -7.22085e-36  
  -7.22083e-36  
  -7.21871e-36  
  -7.2166e-36  
  -7.2166e-36  
  -7.21238e-36  
  -7.21238e-36  
  -5.38603e-36  
  -2.39868e-66  
  -1.77955e-67
```

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

```
Out[113]: 1285x1 Array{Float64,2}:
 8.01438e-52
 1.19594e-51
 1.60147e-51
 1.60241e-51
 1.60241e-51
 1.60288e-51
 1.60335e-51
 1.60335e-51
 3.1819e-51
 3.20388e-51
 3.20481e-51
 4.4058e-51
 6.3638e-51
 ⋮
 6.6665e-17
 6.70766e-17
 6.96733e-17
 7.00697e-17
 7.07202e-17
 7.36787e-17
 7.40941e-17
 7.48391e-17
 7.94004e-17
 7.96053e-17
 9.57602e-17
 1.11476e-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}:
 0.159333  1.12456  1.74333  1.59944  1.55044  ...  0.414889  1.89289  0.46
8333
```

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

```
Out[116]: 1x150 Array{Float64,2}:
 0.22  1.535  1.82  1.605  1.03  1.075  ...  1.145  1.14  0.53  1.85  0.74
```

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

```
Out[117]: 1x150 Array{Float64,2}:
 0.155  1.4  1.785  1.595  1.22  0.91  ...  1.245  1.245  0.42  1.845  0.55
5
```

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

```
Out[118]: 1x150 Array{Float64,2}:
 0.215  1.23  1.78  1.62  1.415  0.675  ...  1.275  1.275  0.445  1.87  0.5
35
```

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

```
Out[119]: 1x150 Array{Float64,2}:  
 0.195  1.14  1.725  1.6   1.59  0.5   1.49  ...  1.42  1.42  0.375  1.9   0.3  
95
```

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

```
Out[120]: 1x150 Array{Float64,2}:  
 0.13  0.97  1.7   1.575  1.725  0.315  ...  0.105  1.39  1.395  0.38  1.9  
0.41
```

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

```
Out[121]: 1x150 Array{Float64,2}:  
 0.156375  1.10825  1.741  1.5995  1.56975  ...  1.34537  0.413  1.89538  
0.461
```

```
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)
```