Function_GeneticGain

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Functions

Covariance Matrices

Function for covariance matrix between true and estimated breeding values

Function for asymptotic covariance matrix between true and estimated breeding values

Genetic Gain selection on index

Function for genetic gain when selecting for index in Sfr./year

Function for correlated genetic gain when selecting for index in trait unit / year

Genetic gain selection on CF

Function for genetic gain when selecting for CF in Sfr./year

Function for correlated genetic gain when selecting for index in trait unit / year

Results

General Inputs

```
##           cCC      aCC      cCF      aCF    cCW     aCW
## [1,]  0.40150  0.33639 -0.00993 -0.03782  1.828   2.538
## [2,]  0.33639  0.40130 -0.00655  0.03484  1.262   3.387
## [3,] -0.00993 -0.00655  0.12067  0.09218 -0.050   0.434
## [4,] -0.03782  0.03484  0.09218  0.13028 -0.404   1.322
## [5,]  1.82800  1.26200 -0.05000 -0.40400 31.100  48.700
## [6,]  2.53800  3.38700  0.43400  1.32200 48.700 194.700
```

```
##          cCC     aCC     cCF     aCF    cCW     aCW
## [1,] 0.35845 0.00000 0.13154 0.00000  2.907   0.000
## [2,] 0.00000 0.26631 0.00000 0.00931  0.000   4.903
## [3,] 0.13154 0.00000 0.23651 0.00000  2.463   0.000
## [4,] 0.00000 0.00931 0.00000 0.19451  0.000   2.162
## [5,] 2.90700 0.00000 2.46300 0.00000 90.400   0.000
## [6,] 0.00000 4.90300 0.00000 2.16200  0.000 346.600
```

```
## [1] 20
```

```
## [1] 5
```

```
## [1] 0.1
```

```
## [1] 0.5
```

```
## [1] 0.5
```

```
## [1] 0.5
```

```
## [1] 5.7
```

```
## [1] 5.4
```

Covariance Matrices

Produce result of function for covariance matrix

```
## 12 x 6 Matrix of class "dgeMatrix"
##                cCC          aCC          cCF          aCF         cCW
##  [1,]  0.28728912  0.269207152 -0.024101853 -0.027013630  1.1930273
##  [2,]  0.26920715  0.292142373 -0.005946672  0.013804679  0.9508704
##  [3,] -0.02410185 -0.005946672  0.070294792  0.067381575 -0.2578107
##  [4,] -0.02701363  0.013804679  0.067381575  0.081882699 -0.3287462
##  [5,]  1.19302727  0.950870356 -0.257810670 -0.328746211 16.4012857
##  [6,]  1.84432820  2.098894545  0.206880238  0.550844212 32.6104547
##  [7,]  0.17017145  0.159030205 -0.017973781 -0.018592365  0.6792986
##  [8,]  0.15903021  0.162244816 -0.007682085 -0.001330154  0.5466557
##  [9,] -0.01797378 -0.007682085  0.036333276  0.035026960 -0.1888854
## [10,] -0.01859237 -0.001330154  0.035026960  0.039095701 -0.2160769
## [11,]  0.67929862  0.546655746 -0.188885408 -0.216076917  8.0702786
## [12,]  0.99632454  1.006559152 -0.004818680  0.082843574 15.0470057
##                aCW
##  [1,]   1.84432820
##  [2,]   2.09889455
##  [3,]   0.20688024
##  [4,]   0.55084421
##  [5,]  32.61045467
##  [6,] 105.97005695
##  [7,]   0.99632454
##  [8,]   1.00655915
##  [9,]  -0.00481868
## [10,]   0.08284357
## [11,]  15.04700565
## [12,]  41.90456913
```

Produce result of function for asymptotic covariance matrix

```
## 12 x 6 Matrix of class "dgeMatrix"
##                cCC          aCC          cCF          aCF         cCW
##  [1,]  0.187207076  0.175503339 -0.015026731 -0.017127229  0.78244165
##  [2,]  0.175503339  0.192352721 -0.003111346  0.010741070  0.62266224
##  [3,] -0.015026731 -0.003111346  0.046780354  0.044805026 -0.16135631
##  [4,] -0.017127229  0.010741070  0.044805026  0.055084440 -0.21030228
##  [5,]  0.782441648  0.622662239 -0.161356311 -0.210302281 10.98959612
##  [6,]  1.219475432  1.411164565  0.158193116  0.403643288 22.03388249
##  [7,]  0.070089408  0.065326393 -0.008898659 -0.008705964  0.26871299
##  [8,]  0.065326393  0.062455164 -0.004846760 -0.004393764  0.21844763
##  [9,] -0.008898659 -0.004846760  0.012818838  0.012450411 -0.09243105
## [10,] -0.008705964 -0.004393764  0.012450411  0.012297442 -0.09763299
```

```
## [11,]  0.268712990  0.218447628 -0.092431049 -0.097632987  2.65858897
## [12,]  0.371471778  0.318829171 -0.053505802 -0.064357351  4.47043347
##               aCW
##  [1,]  1.21947543
##  [2,]  1.41116456
##  [3,]  0.15819312
##  [4,]  0.40364329
##  [5,] 22.03388249
##  [6,] 72.88438136
##  [7,]  0.37147178
##  [8,]  0.31882917
##  [9,] -0.05350580
## [10,] -0.06435735
## [11,]  4.47043347
## [12,]  8.81889354
```

Angus

Breed specific input

```
## [1]  0.479417700  0.256684900  0.418876900 -0.069085800 -0.088156252
## [6] -0.002195078
```

Genetic gain index

```
## [1] 0.06306061
```

Correlated genetic gain index

```
##      trait
## [1,] "cCC" "0.038174065562569"
## [2,] "aCC" "0.0470001534625087"
## [3,] "cCF" "0.0140769117416899"
## [4,] "aCF" "0.0166593486210998"
## [5,] "cCW" "-0.301574147992976"
## [6,] "aCW" "-0.621316101739681"
```

Genetic gain CF

```
## [1] 0.02286001
```

Correlated genetic gain CF

```
##      trait
## [1,] "cCC" "-0.0171980241633864"
## [2,] "aCC" "0.00411070021047558"
## [3,] "cCF" "0.0385030530260203"
## [4,] "aCF" "0.0450712319002212"
## [5,] "cCW" "-0.205375432325404"
## [6,] "aCW" "0.224245768154972"
```

Limousin

Breed specific input

```
## [1]  0.386055800  0.196170100  0.576160200  0.135590000 -0.164163323
## [6] -0.002251035
```

Genetic gain index

```
## [1] 0.1037291
```

Correlated genetic gain index

```
##      trait
## [1,] "cCC" "-0.013555613729995"
## [2,] "aCC" "-0.000745472217530385"
## [3,] "cCF" "0.020982393054045"
## [4,] "aCF" "0.0240509783443276"
## [5,] "cCW" "-0.557251877309649"
## [6,] "aCW" "-1.01193935075086"
```

Genetic gain CF

```
## [1] 0.05403066
```

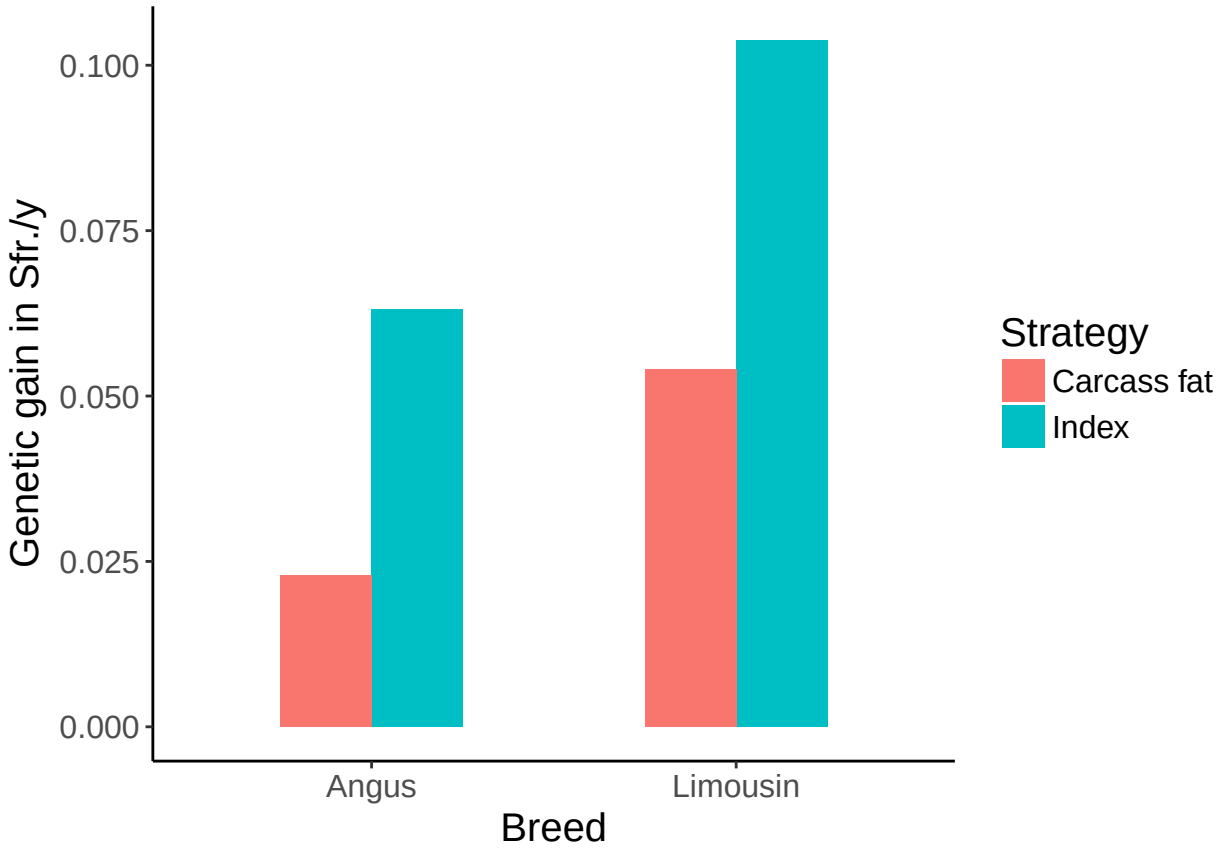
Correlated genetic gain CF

```
##      trait
## [1,] "cCC" "-0.0172781860281692"
## [2,] "aCC" "0.00300563140393629"
## [3,] "cCF" "0.0393554472365974"
## [4,] "aCF" "0.0449796408691598"
## [5,] "cCW" "-0.203183228485631"
## [6,] "aCW" "0.21069441257492"
```

Graphics

Produce barplot genetic gain Sfr.

```
##         Gain    Breed    Strategy
## 1 0.06306061    Angus       Index
## 2 0.10372906 Limousin       Index
## 3 0.02286001    Angus Carcass fat
## 4 0.05403066 Limousin Carcass fat
```



Produce barplot correlated genetic gains trait units.

```
##    trait          Gain    Breed Strategy
## 1    cCC  0.0381740656    Angus    Index
## 2    aCC  0.0470001535    Angus    Index
## 3    cCF  0.0140769117    Angus    Index
## 4    aCF  0.0166593486    Angus    Index
## 5    cCW -0.3015741480    Angus    Index
## 6    aCW -0.6213161017    Angus    Index
## 7    cCC -0.0171980242    Angus       CF
## 8    aCC  0.0041107002    Angus       CF
## 9    cCF  0.0385030530    Angus       CF
## 10   aCF  0.0450712319    Angus       CF
## 11   cCW -0.2053754323    Angus       CF
## 12   aCW  0.2242457682    Angus       CF
## 13   cCC -0.0135556137 Limousin    Index
## 14   aCC -0.0007454722 Limousin    Index
## 15   cCF  0.0209823931 Limousin    Index
## 16   aCF  0.0240509783 Limousin    Index
## 17   cCW -0.5572518773 Limousin    Index
## 18   aCW -1.0119393508 Limousin    Index
## 19   cCC -0.0172781860 Limousin       CF
## 20   aCC  0.0030056314 Limousin       CF
## 21   cCF  0.0393554472 Limousin       CF
## 22   aCF  0.0449796409 Limousin       CF
## 23   cCW -0.2031832285 Limousin       CF
```

```
## 24   aCW  0.2106944126 Limousin       CF
```