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] "/Library/Frameworks/R.framework/Versions/3.4/Resources/library/Exemplary/extdata/adults_calves_l
```

```
## [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 -0.009965691
## [6] -0.002225939
```

Genetic gain index

```
## [1] 0.0592353
```

Correlated genetic gain index

```
##      trait
## [1,] "cCC" "0.0818224917411796"
## [2,] "aCC" "0.0829853370024958"
## [3,] "cCF" "0.00523627314836787"
## [4,] "aCF" "0.00580419188970208"
## [5,] "cCW" "0.221080335830456"
## [6,] "aCW" "0.39627550600539"
```

Genetic gain CF

```
## [1] 0.007942945
```

Correlated genetic gain CF

```
##      trait
## [1,] "cCC" "-0.0172779049266672"
## [2,] "aCC" "0.000578359087859804"
## [3,] "cCF" "0.0408444415446996"
## [4,] "aCF" "0.0443196471721994"
```

```
## [5,] "cCW" "-0.199687557800121"
## [6,] "aCW" "0.170255976620391"
```

Limousin

Breed specific input

```
## [1]  0.386055800  0.196170100  0.576160200  0.135590000 -0.018240416
## [6] -0.002288015
```

Genetic gain index

```
## [1] 0.05141143
```

Correlated genetic gain index

```
##      trait
## [1,] "cCC" "0.0617784137551243"
## [2,] "aCC" "0.0697995818443714"
## [3,] "cCF" "0.0210141340970974"
## [4,] "aCF" "0.0225558133680595"
## [5,] "cCW" "0.0422543016908949"
## [6,] "aCW" "0.229977099967115"
```

Genetic gain CF

```
## [1] 0.026449
```

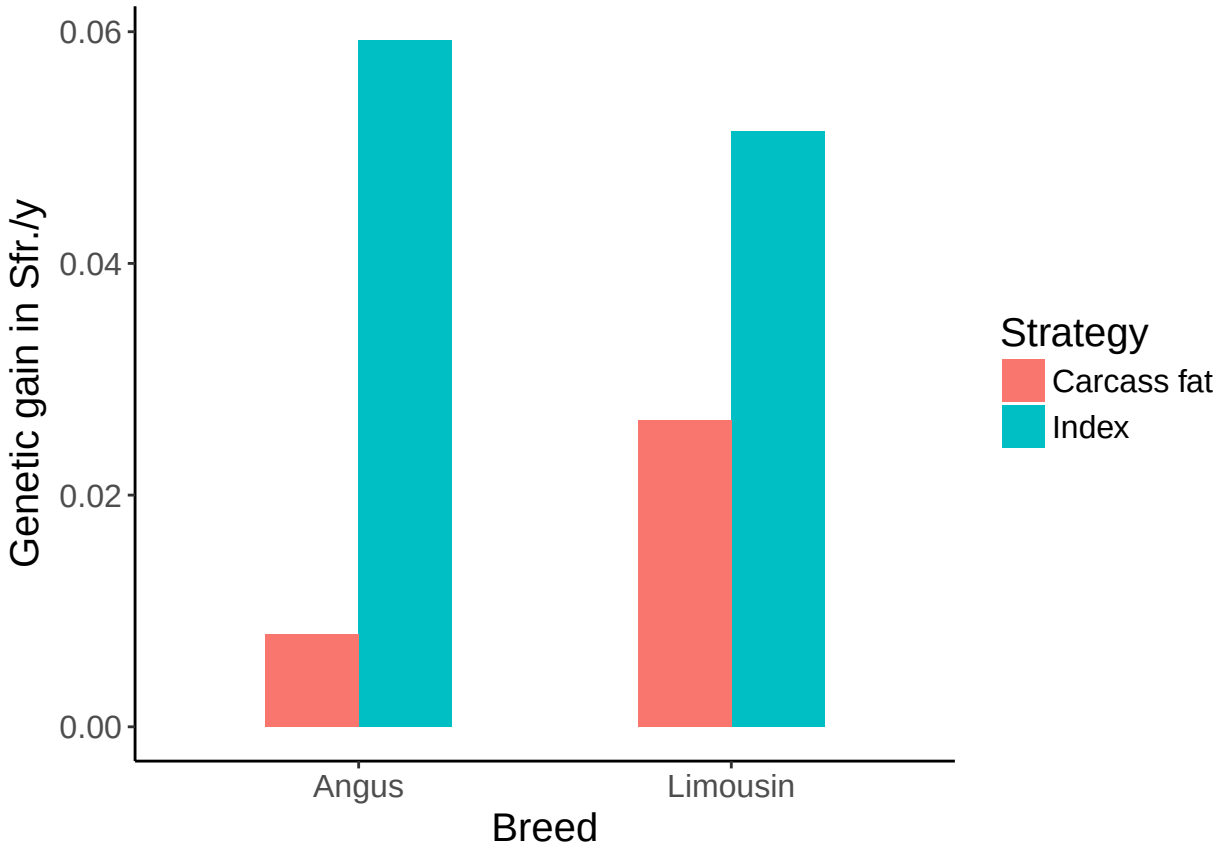
Correlated genetic gain CF

```
##      trait
## [1,] "cCC" "-0.0172701526906628"
## [2,] "aCC" "-0.000285471296372983"
## [3,] "cCF" "0.0412476027628186"
## [4,] "aCF" "0.0440103400596969"
## [5,] "cCW" "-0.195581803265262"
## [6,] "aCW" "0.162838893869772"
```

Graphics

Produce barplot genetic gain Sfr.

```
##          Gain    Breed    Strategy
## 1 0.059235297    Angus       Index
## 2 0.051411429 Limousin       Index
## 3 0.007942945    Angus Carcass fat
## 4 0.026448997 Limousin Carcass fat
```



Produce barplot correlated genetic gains trait units.

```
##    trait          Gain    Breed Strategy
## 1    cCC  0.0818224917    Angus    Index
## 2    aCC  0.0829853370    Angus    Index
## 3    cCF  0.0052362731    Angus    Index
## 4    aCF  0.0058041919    Angus    Index
## 5    cCW  0.2210803358    Angus    Index
## 6    aCW  0.3962755060    Angus    Index
## 7    cCC -0.0172779049    Angus       CF
## 8    aCC  0.0005783591    Angus       CF
## 9    cCF  0.0408444415    Angus       CF
## 10   aCF  0.0443196472    Angus       CF
## 11   cCW -0.1996875578    Angus       CF
## 12   aCW  0.1702559766    Angus       CF
## 13   cCC  0.0617784138 Limousin    Index
## 14   aCC  0.0697995818 Limousin    Index
## 15   cCF  0.0210141341 Limousin    Index
## 16   aCF  0.0225558134 Limousin    Index
## 17   cCW  0.0422543017 Limousin    Index
## 18   aCW  0.2299771000 Limousin    Index
## 19   cCC -0.0172701527 Limousin       CF
## 20   aCC -0.0002854713 Limousin       CF
## 21   cCF  0.0412476028 Limousin       CF
## 22   aCF  0.0440103401 Limousin       CF
## 23   cCW -0.1955818033 Limousin       CF
```

```
## 24   aCW  0.1628388939 Limousin       CF
```