Gaussian Example

While `fasgllvm` can be used for Gaussian responses, it is unnecessarily complicated: the gaussian model admits closed form expressions for my algorithm to compute the MLE, and another function – not yet published – converges orders of magnitude faster and does not require the convergence to be manually checked. Nevertheless, `fastgllvm` should still produce good results, as we now demonstrate.

```
library(fastgllvm)
data <- read.table("dataset.dat", header=T)
```

Setting 1: p=4, q=1

Be sure to include an intercept if the data Y are not centered. I think `factanal` factorizes the correlation matrix (so centering is done automatically).

```
F1<-factanal(x = ~x1 + x2 + x3 + x9, factors = 1, data = data[, c(1:3, 9)])

Y<-data[,c(1:3,9)]

Y<-as.matrix(Y)

set.seed(1234)
fit<-fastgllvm(Y, q = 1, family="gaussian",  intercept = T)
```

The function `fastgllvm` requires to check the convergence of the stochastic algorithm, which can be done visually using the `plot` function (automatic checks will be implemented later):

If necessary, update the fit by running more iterations using the `update` function:

```
fit <- update(fit)
```

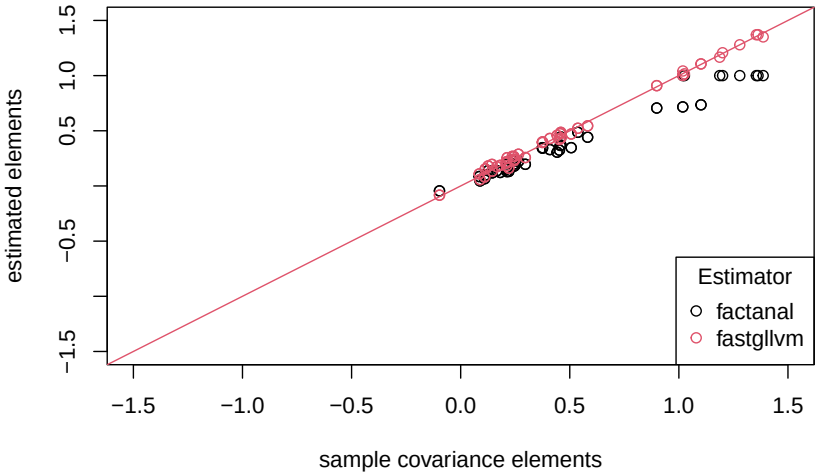
Setting 2: p=9, q=3

```
Y <- as.matrix(data)
F2 <- factanal(Y, factors = 3)

set.seed(1234)
fit <- fastgllvm(Y, q=3, family="gaussian", intercept = T)
```

```
##   |                                                      |                                                      |   0% In
##
##  Iteration:  1  - crit:  0.005423099
##  Iteration:  6  - crit:  0.01137
##  Iteration:  11  - crit:  0.00817496
##  Iteration:  16  - crit:  0.005266487
##  Iteration:  21  - crit:  0.00309248
##  Iteration:  26  - crit:  0.002461501
##  Iteration:  31  - crit:  0.001698933
##  Iteration:  36  - crit:  0.00097493
```

One can check if the factorization was successful by plotting the elements of the sample covariance of Y against those of its estimated factorization $\Lambda\Lambda^\top + \Psi$:


estimated elements
sample covariance elements
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
Estimator
factanal
fastgllvm