Implementation Checks on tflash_kron

David Gerard

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Abstract.

I run some implementation checks on `tflash_kron`.

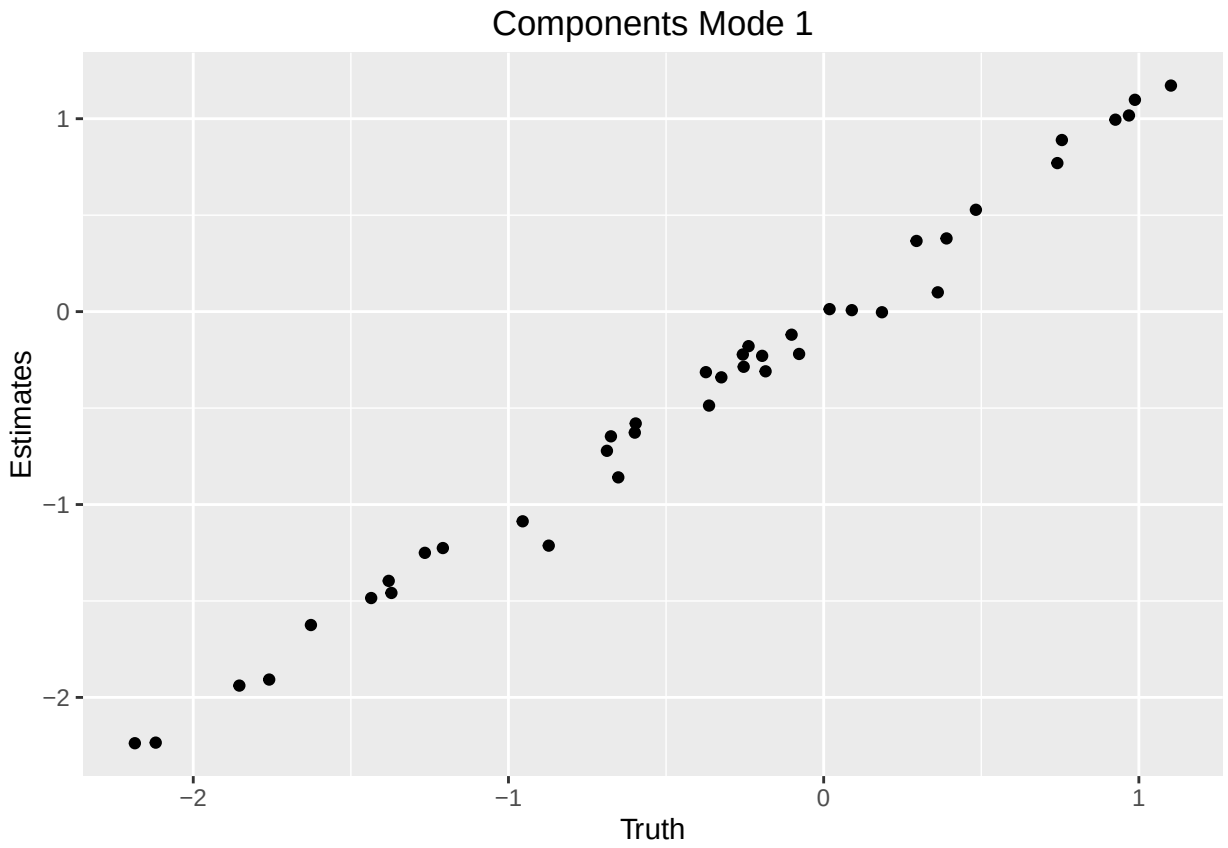
Now it works well

After changing initial variances, works really well.

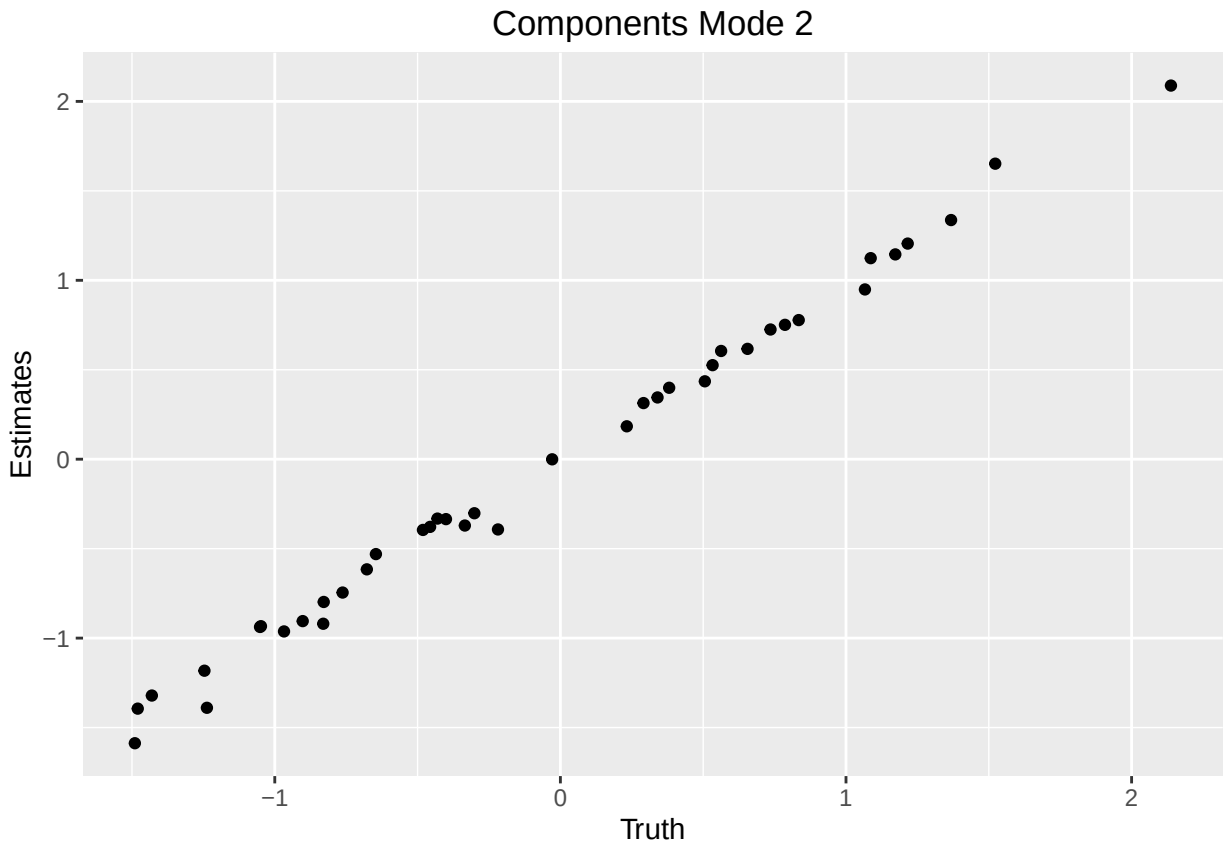
```
library(flashr)
rm(list = ls())
set.seed(10)
p <- c(40, 40, 40)
u <- list()
u[[1]] <- rnorm(p[1])
u[[2]] <- rnorm(p[2])
u[[3]] <- rnorm(p[3])
Theta <- form_outer(u)

true_cov_half <- list()
for (mode_index in 1:length(p)) {
  true_cov_half[[mode_index]] <- diag(sqrt(seq(1, 3, length = p[mode_index])))
}

E <- tensr::atrans(array(rnorm(prod(p)), dim = p), true_cov_half)
Y <- Theta + E
```

Fit model and plot estimates. Posterior means are all zero and variances are super large.

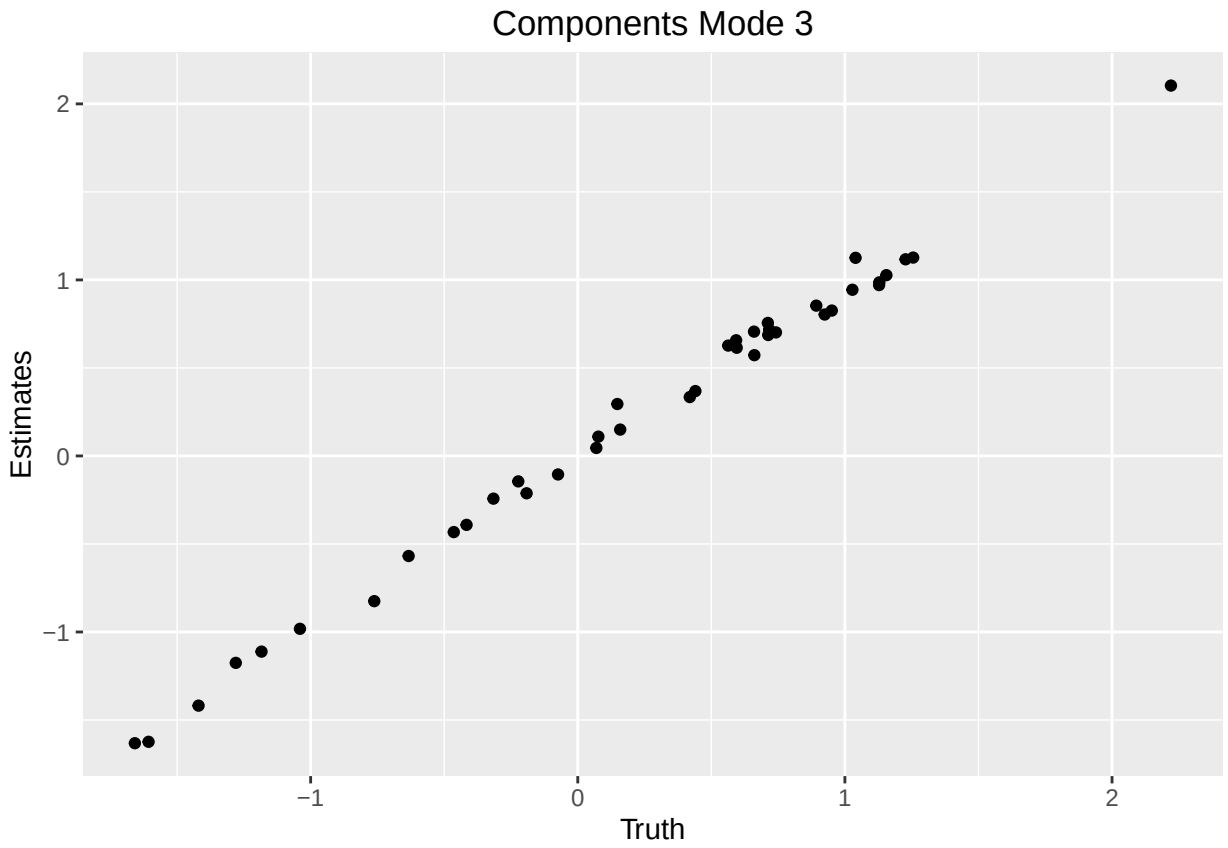
```
library(ggplot2)
tout <- tflash_kron(Y)
qplot(u[[1]], tout$post_mean[[1]], xlab = "Truth", ylab = "Estimates", main = "Components Mode 1")
```



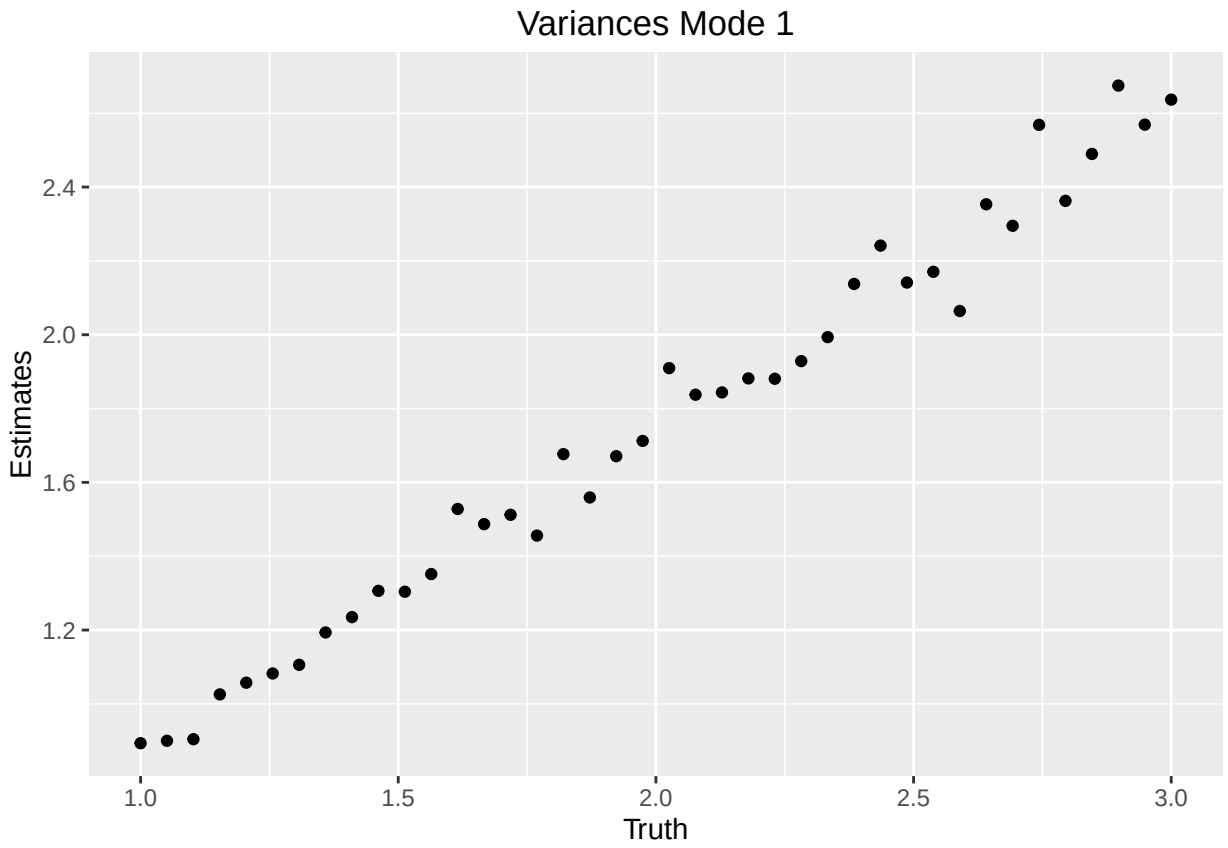

```
qplot(u[[2]], tout$post_mean[[2]], xlab = "Truth", ylab = "Estimates", main = "Components Mode 2")
```



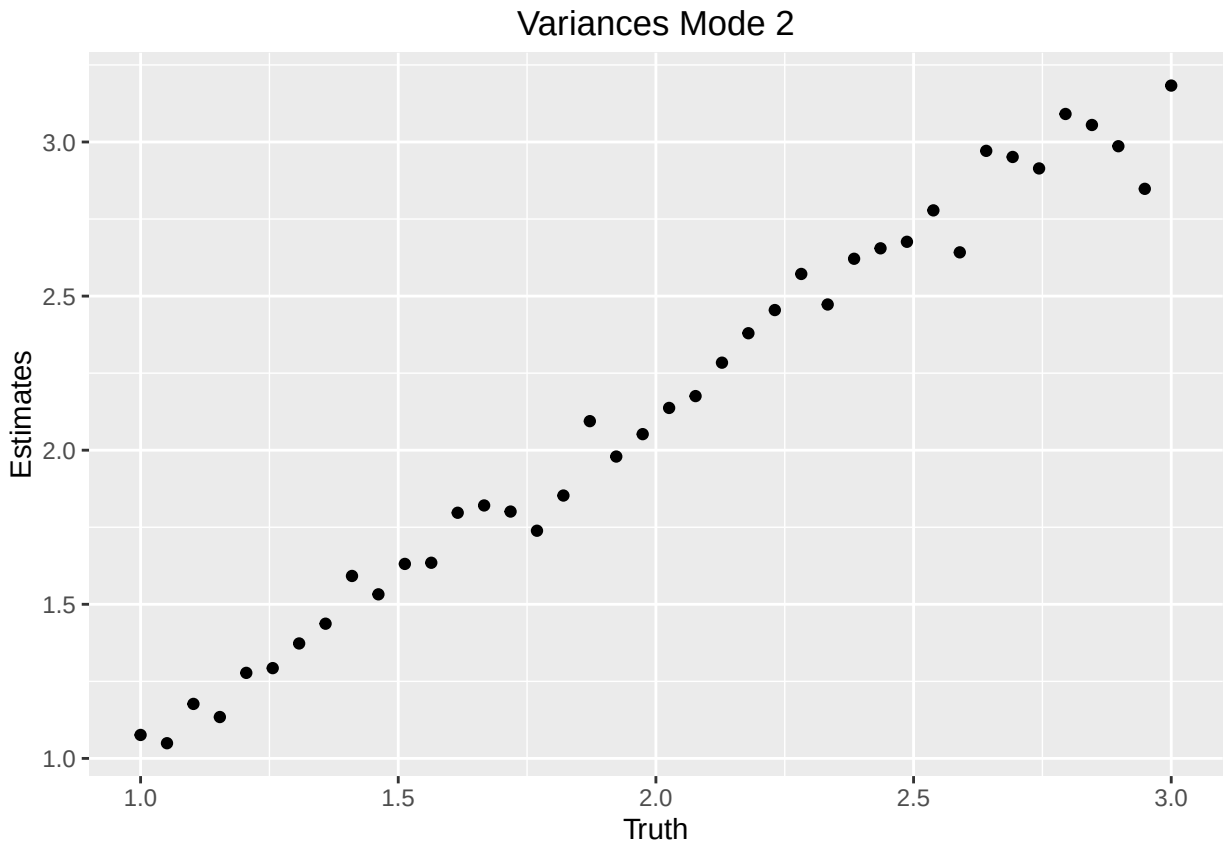

```
qplot(u[[3]], tout$post_mean[[3]], xlab = "Truth", ylab = "Estimates", main = "Components Mode 3")
```



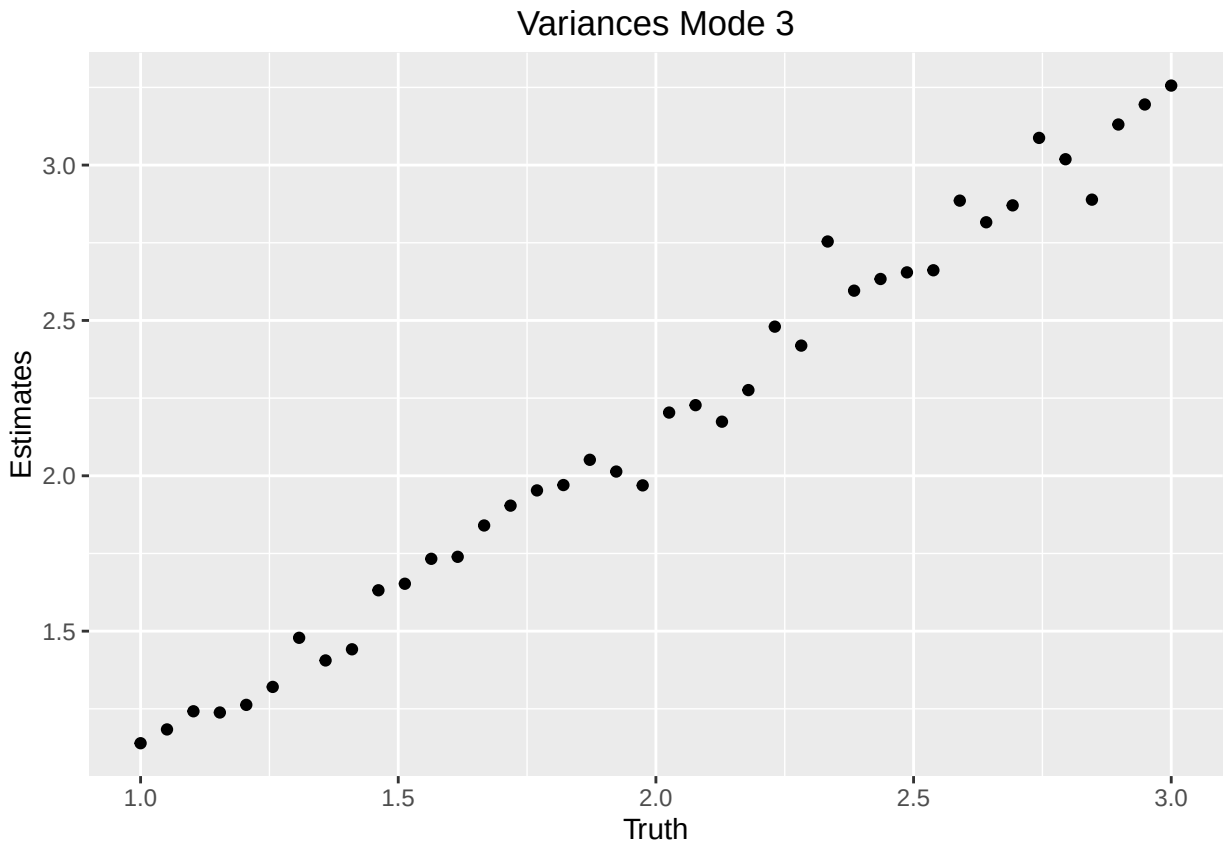

```
qplot(diag(true_cov_half[[1]]) ^ 2, 1 / tout$sigma_est[[1]], xlab = "Truth", ylab = "Estimates", main =
```




```
qplot(diag(true_cov_half[[2]]) ^ 2, 1 / tout$sigma_est[[2]], xlab = "Truth", ylab = "Estimates", main =
```



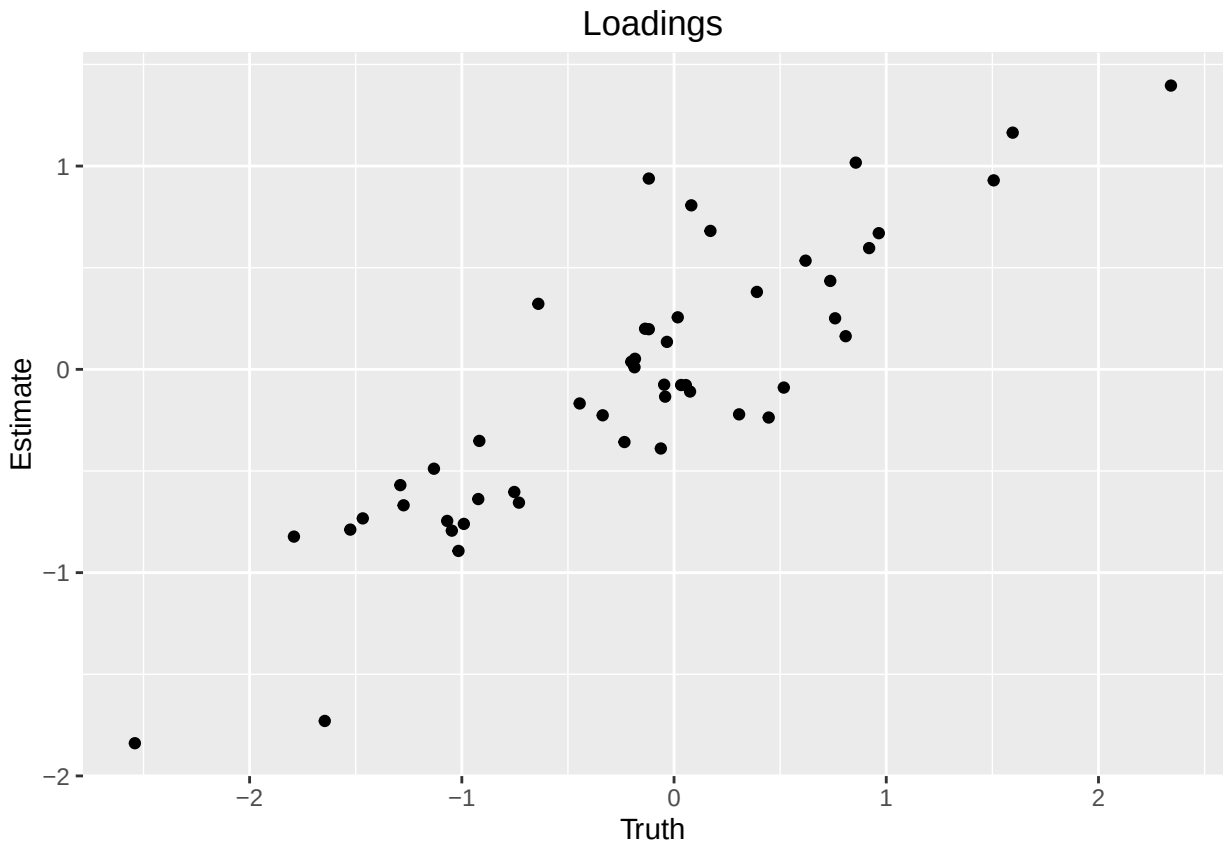

```
qplot(diag(true_cov_half[[3]]) ^ 2, 1 / tout$sigma_est[[3]], xlab = "Truth", ylab = "Estimates", main =
```



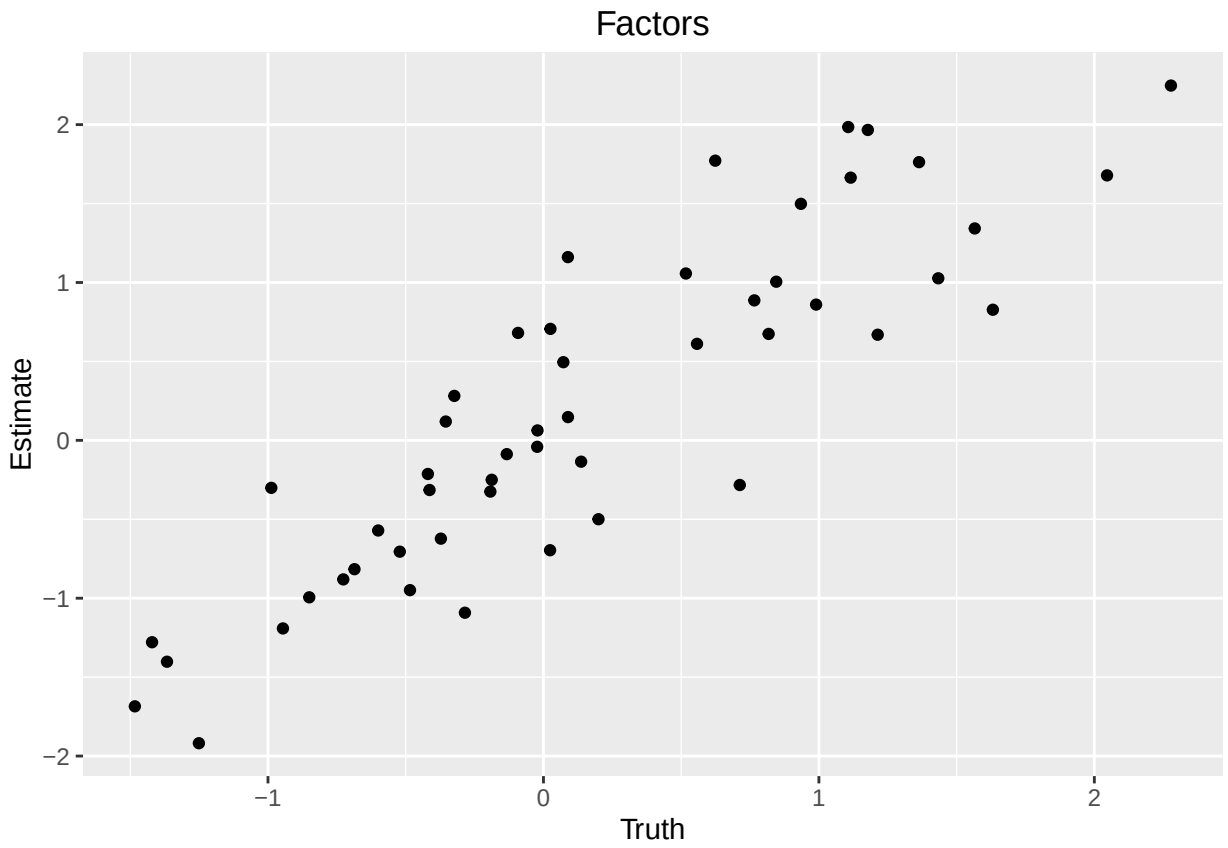
What about Matrix Data?

Works great this time:

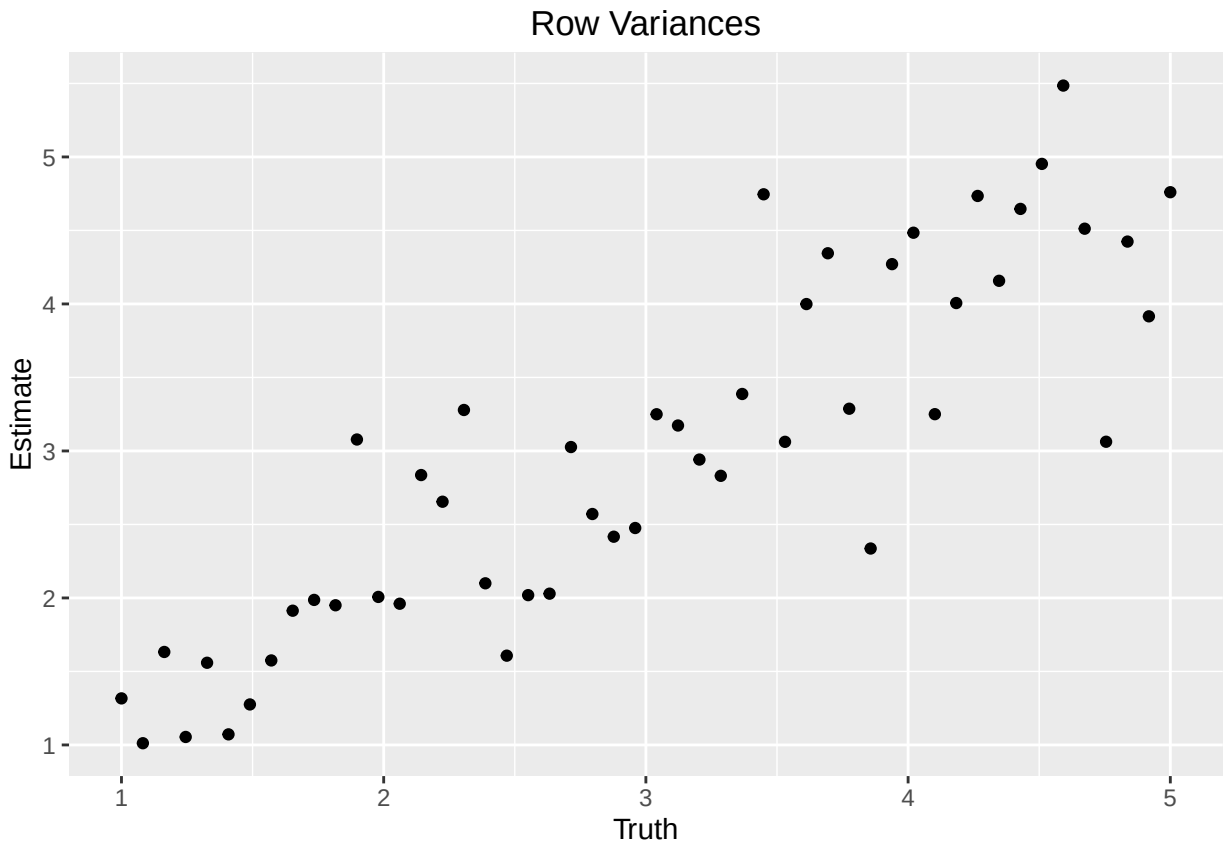
```
rm(list = ls())
set.seed(31)
n <- 50
p <- 50
u <- rnorm(n)
v <- rnorm(p)
row_cov_half <- diag(sqrt(seq(1, 5, length = n)))
col_cov_half <- diag(sqrt(seq(1, 5, length = p)))
E <- row_cov_half %*% matrix(rnorm(n * p), nrow = n) %*% col_cov_half
Y <- u %*% t(v) + E

mat_out <- tflash_kron(Y)

qplot(u, mat_out$post_mean[[1]], xlab = "Truth", ylab = "Estimate", main = "Loadings")
```



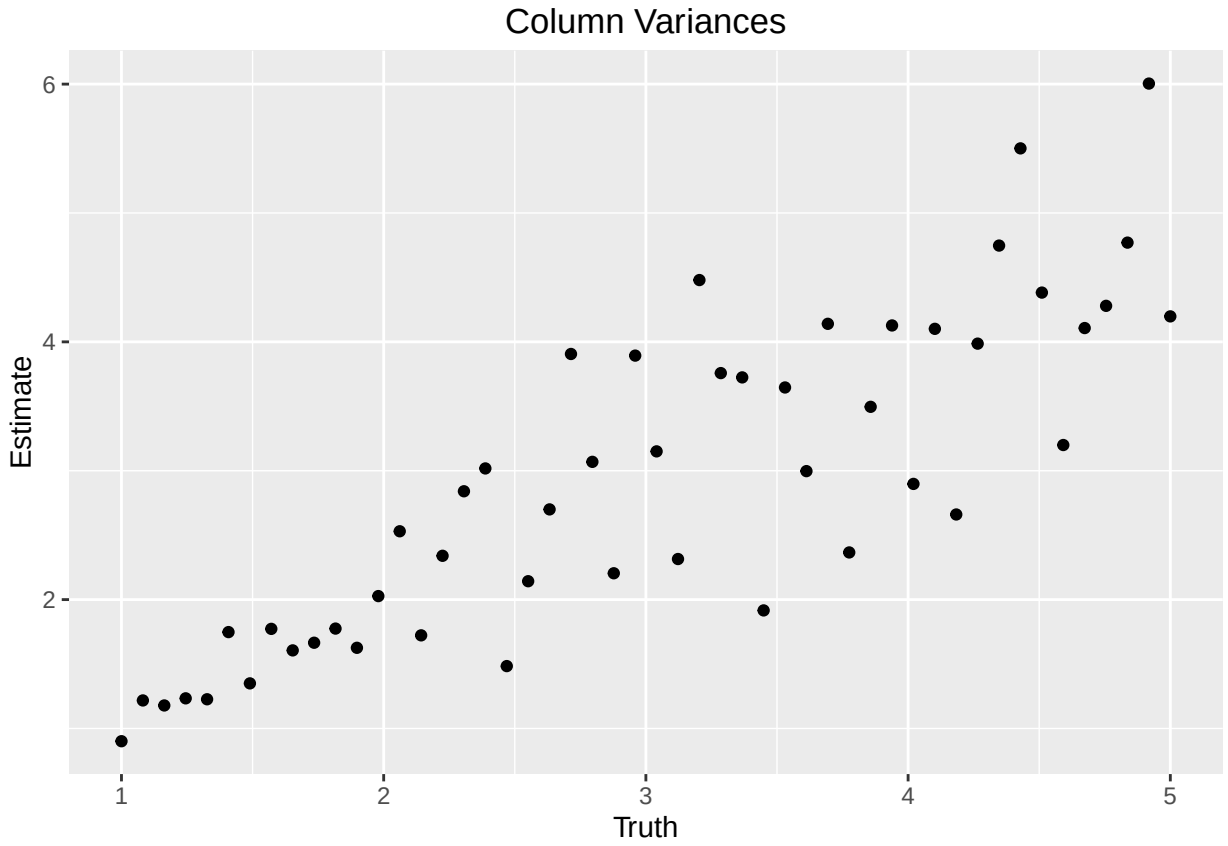

```
qplot(v, mat_out$post_mean[[2]], xlab = "Truth", ylab = "Estimate", main = "Factors")
```




```
qplot(diag(row_cov_half) ^ 2, 1 / mat_out$sigma_est[[1]], xlab = "Truth", ylab = "Estimate", main  = "R
```




```
qplot(diag(col_cov_half) ^ 2, 1 / mat_out$sigma_est[[2]], xlab = "Truth", ylab = "Estimate", main = "Co
```


Column Variances
Estimate
Truth
6
4
2
1
2
3
4
5