

### Explanation of the exercises:

We agree on every exercise and proof. The mathematical steps are well outlined and the results are properly commented in terms of interpretation.

### Latex formatting:

The Latex file is very well organized and structured overall. The exercises are well separated and they are clearly explained. I appreciate the bold notation for vectors and matrices, that makes the reading easier. The only thing I would avoid is the numbering of the equations that you don't refer to in the text. This would make the numbering less cumbersome in such a long .pdf file like the one for this homework.

### Coding:

As far as the coding is concerned, I only have a couple of remarks. First of all, try and use the `crossprod(X, y)` function as much as possible when computing an expression as `t(X) %*% y`. This is particularly useful if the result is a symmetric matrix, as in the case `t(X) %*% X`, which can be expressed as `crossprod(X)` by saving half of the flops operations.

Try and write modular code by using R functions, that will be handy in the future. In this particular homework, I can only see an example of it. When sampling the normally distributed data using the singular values decomposition, you could have written a function that, given a sample size  $n$  and a mean vector and a covariance matrix would achieve that, instead of simply writing the code in the script.

Apart from these remarks, the code is well written and structured. Comments make your code more readable when necessary!