Propagating Monte Carlo Error

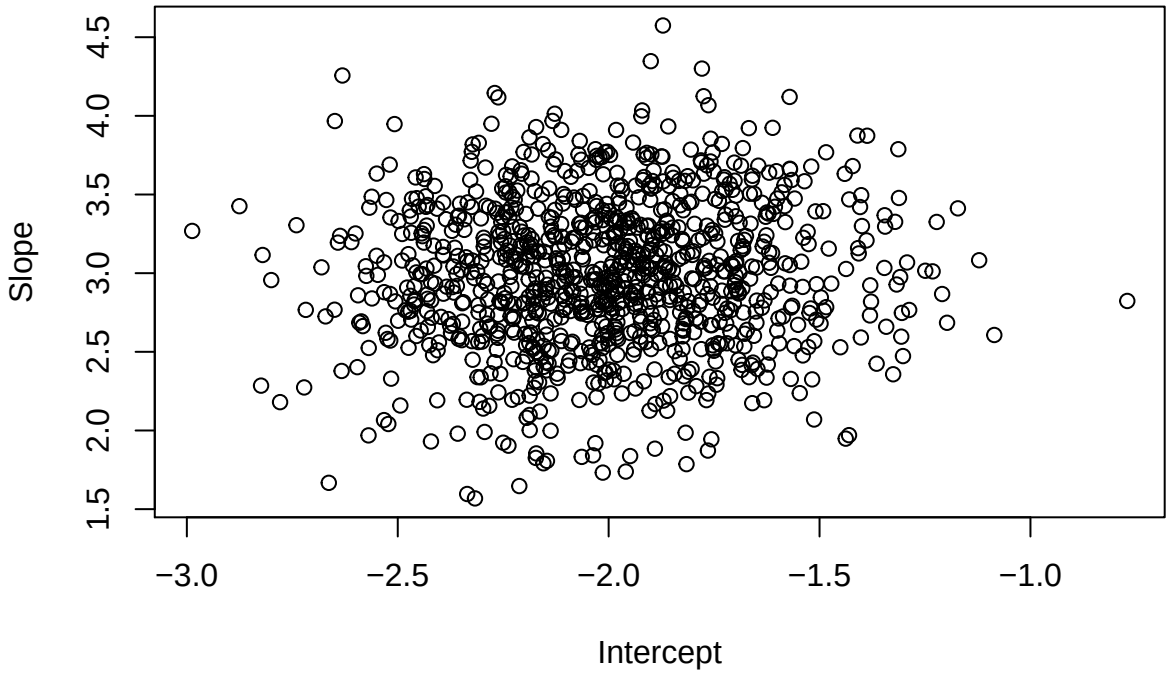
Team A7

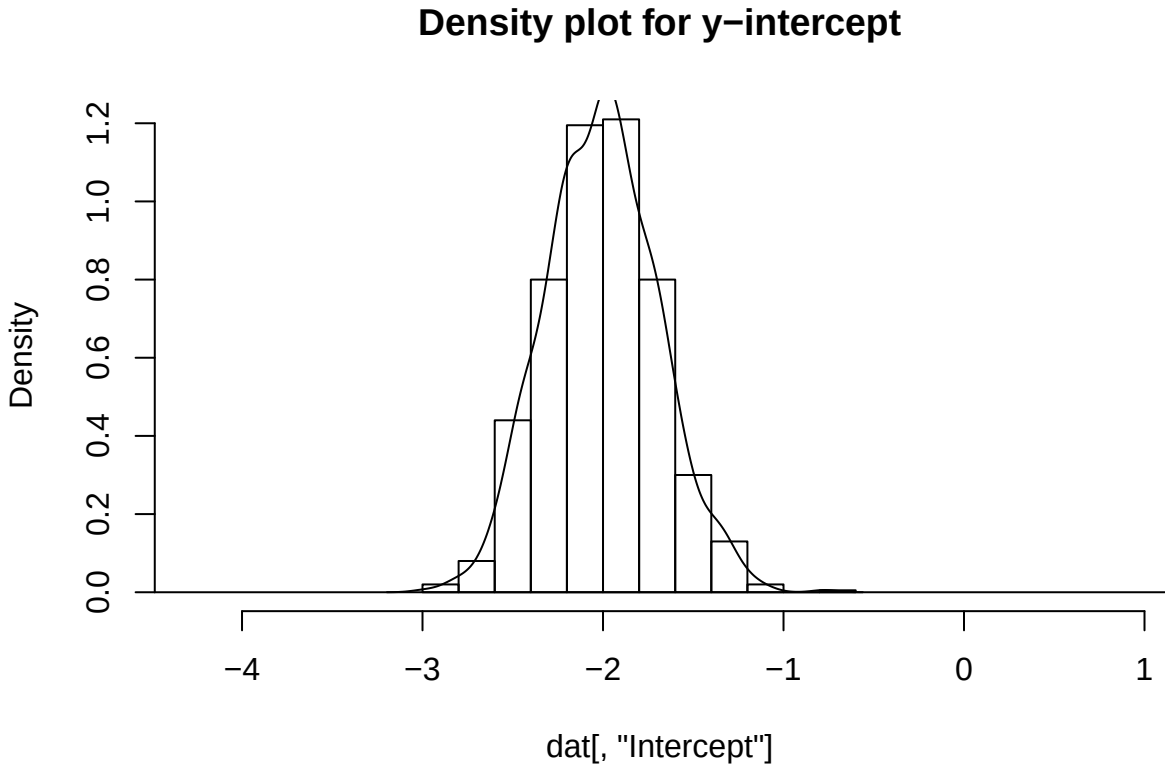
11/29/2018

The functions we are using to generate the fake data are: 1. f1(x) = -2 + 3x 2. f2(x) = 3 3. f3(x) = 6x^2 + 3x + 3 4. f4(x) = 10x + 3 5. f5(x) = -4x - 6

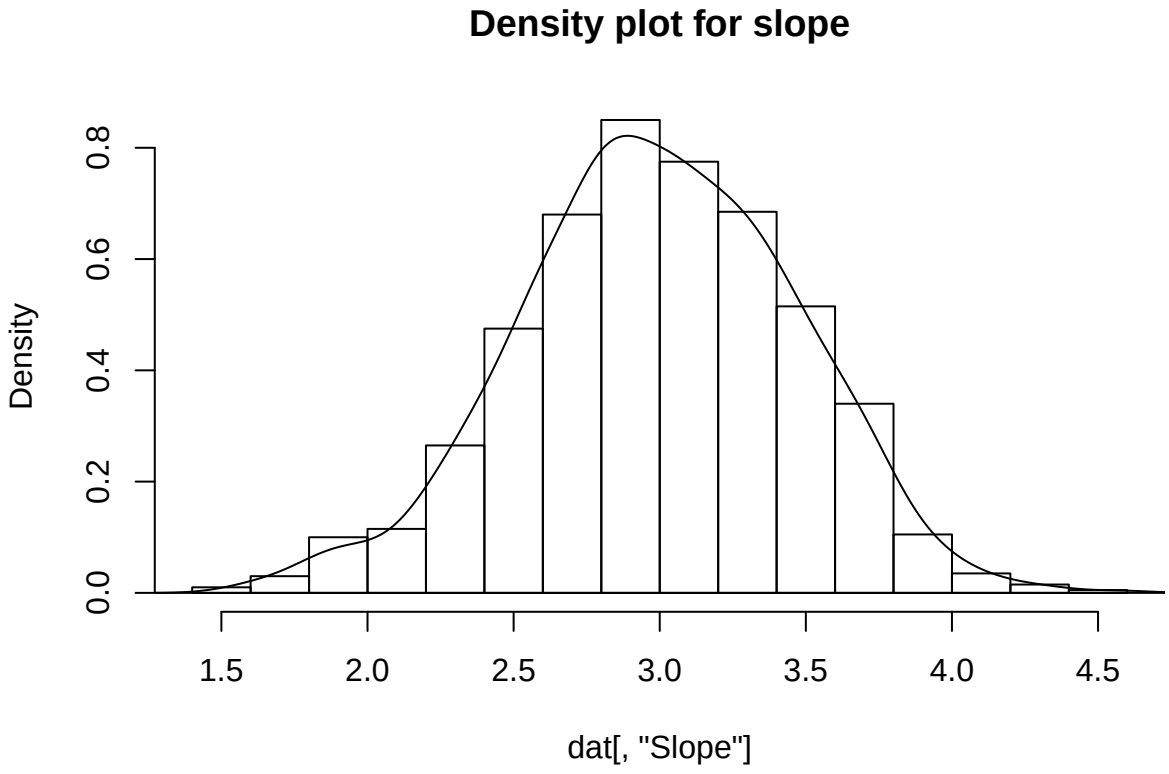
```
f1 <- function(x) -2 + (3*x)
f2 <- function(x) 3
f3 <- function(x) (6*(x**2)) + (3*x) + 3
f4 <- function(x) (10*x) + 3
f5 <- function(x) (-4 * x) - 6

makeFakeData <- function(f) {
    f(mytab[,1]) + rnorm(n = length(mytab[,1]), mean = 0, sd = 1)
}
```



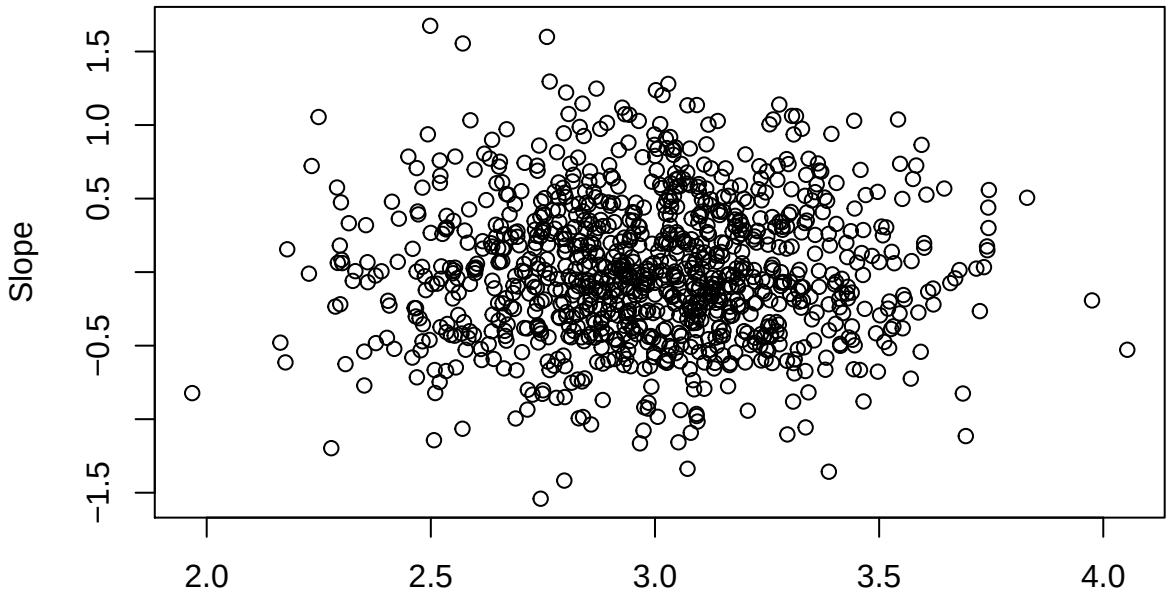



```
## [1] Function number 1
```

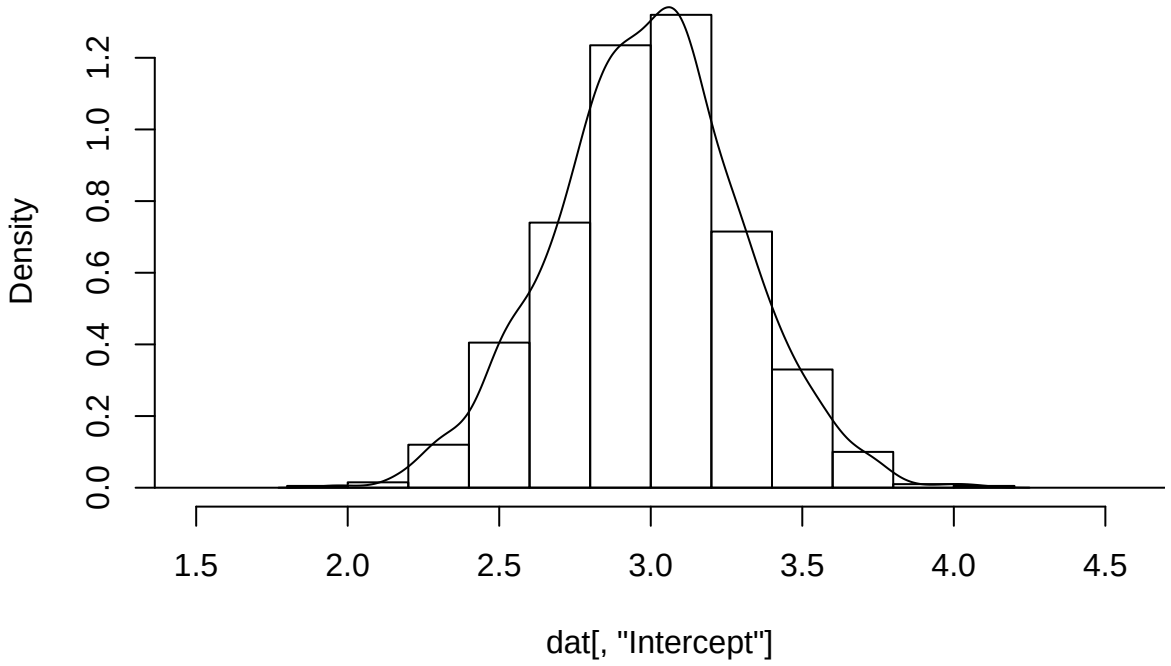



```
## [1] Function number 1
## [1] Mean of the intercept: -2.0062907809753
## [1] Variance of the intercept: 2.99087216257581
```

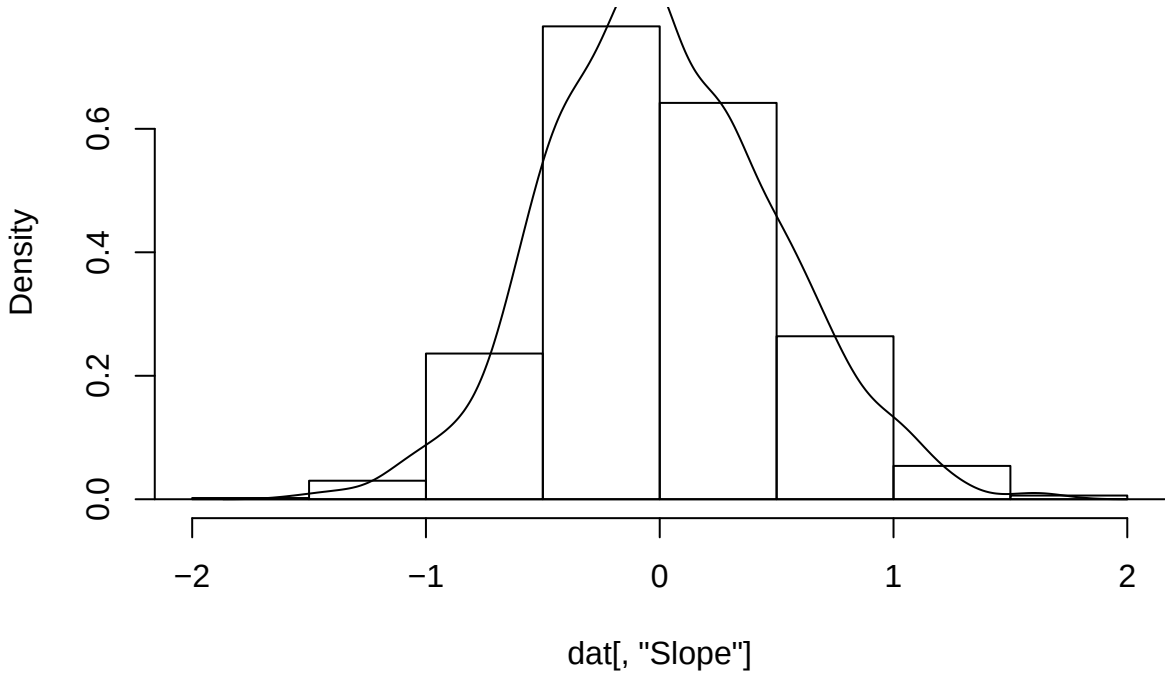
```
## [1] Mean of the slope: 0.471208590542713
## [1] Variance of the slope: 0.309301952761064
## [1]
```



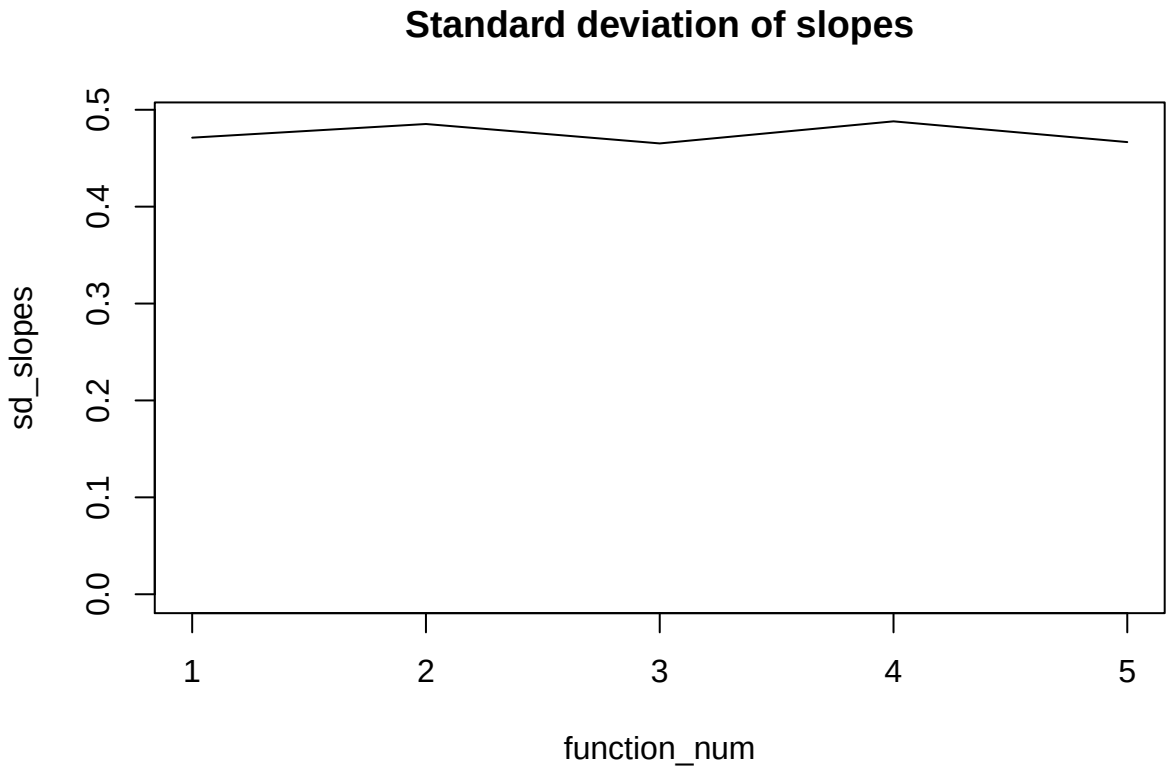
Density plot for y−intercept

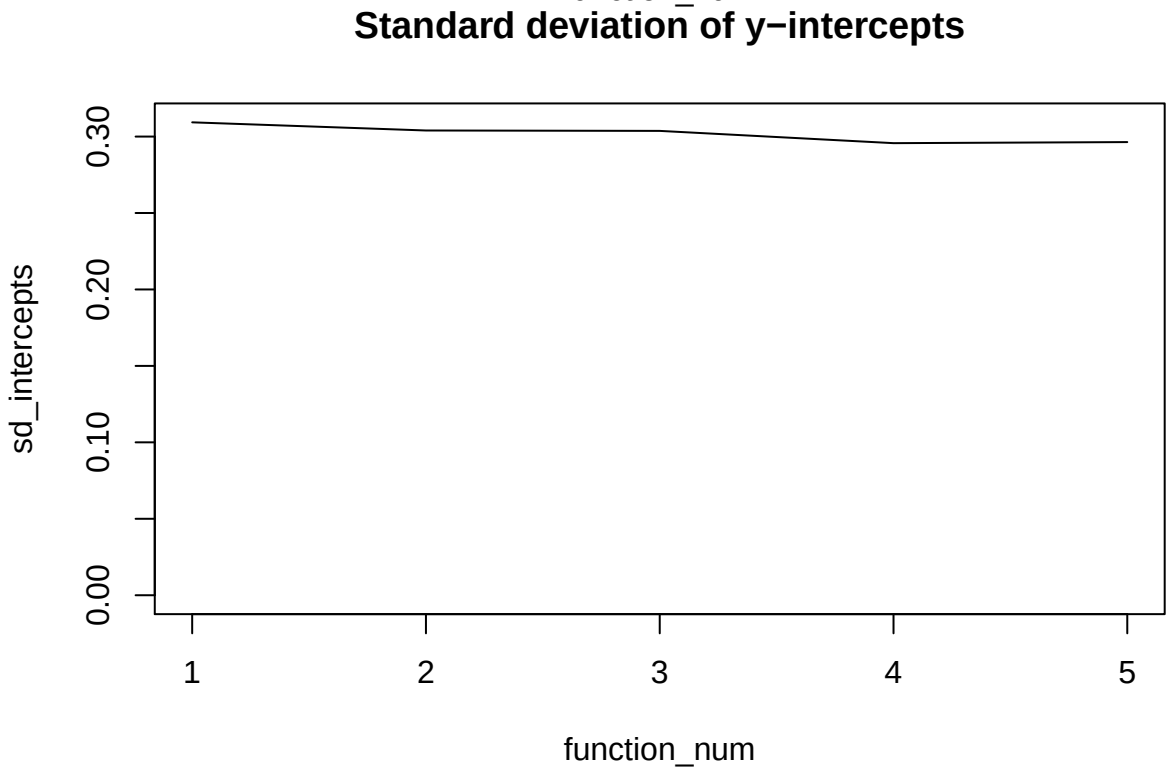


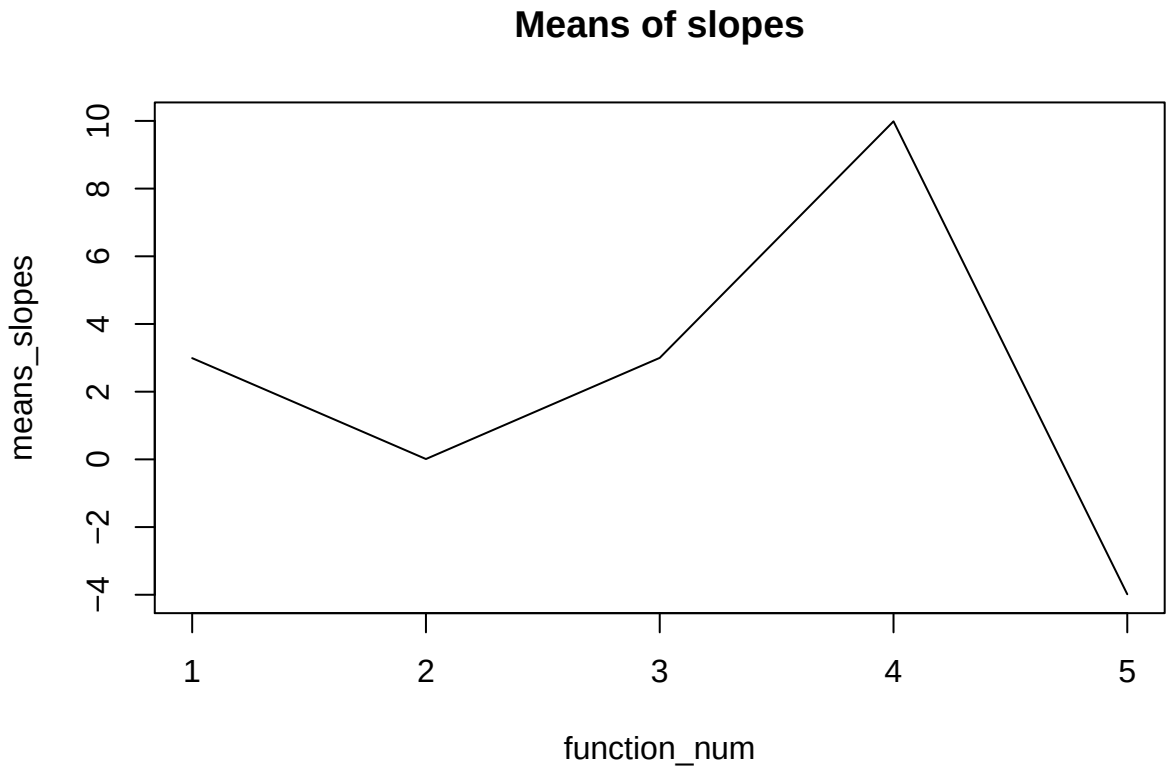

```
## [1] Function number 2
```

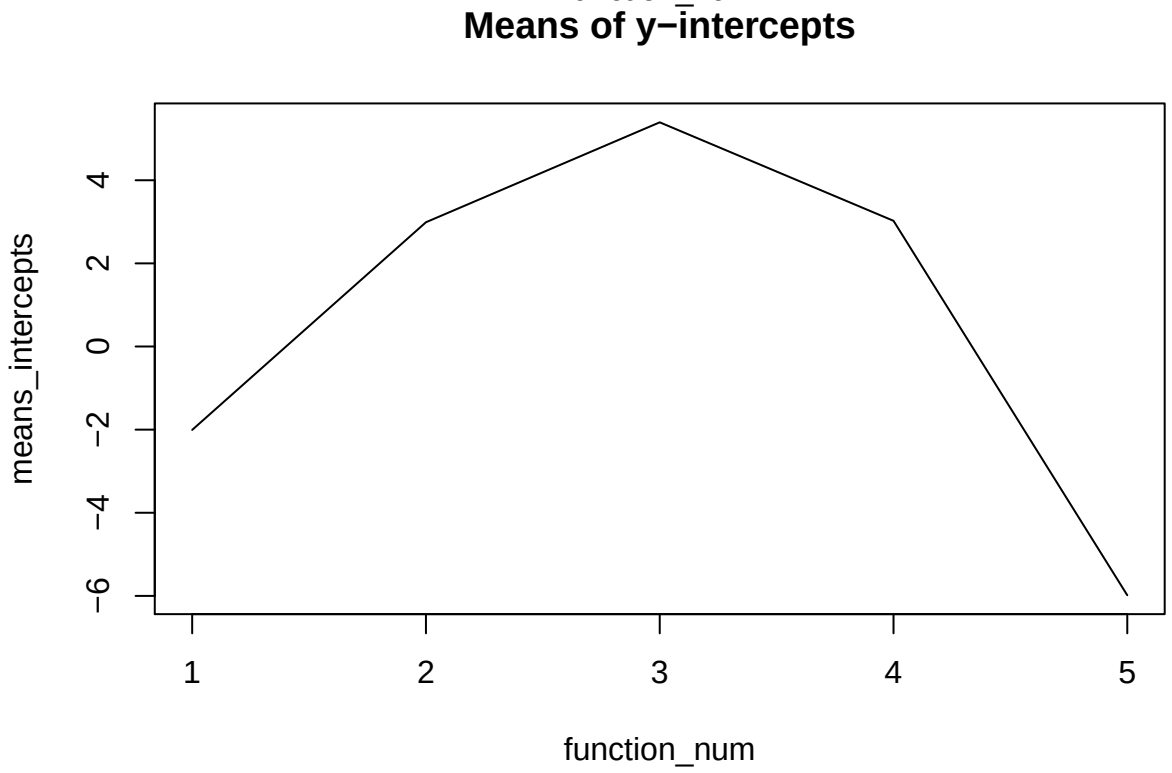



```
## [1] Function number 2
## [1] Mean of the intercept: 2.9894106340412
## [1] Variance of the intercept: 0.0105050498880181
## [1] Mean of the slope: 0.485302592631189
## [1] Variance of the slope: 0.303972488197585
## [1]
## [1] Mean of the intercept: 5.3930465076913
## [1] Variance of the intercept: 2.99868245288829
## [1] Mean of the slope: 0.465264221678631
## [1] Variance of the slope: 0.303715276166687
## [1]
## [1] Mean of the intercept: 3.02408019062166
## [1] Variance of the intercept: 9.98692127558618
## [1] Mean of the slope: 0.488038694444008
## [1] Variance of the slope: 0.295679789799682
## [1]
## [1] Mean of the intercept: -5.98405652896976
## [1] Variance of the intercept: -3.98442286784205
## [1] Mean of the slope: 0.466625678918393
## [1] Variance of the slope: 0.296378792989985
## [1]
```

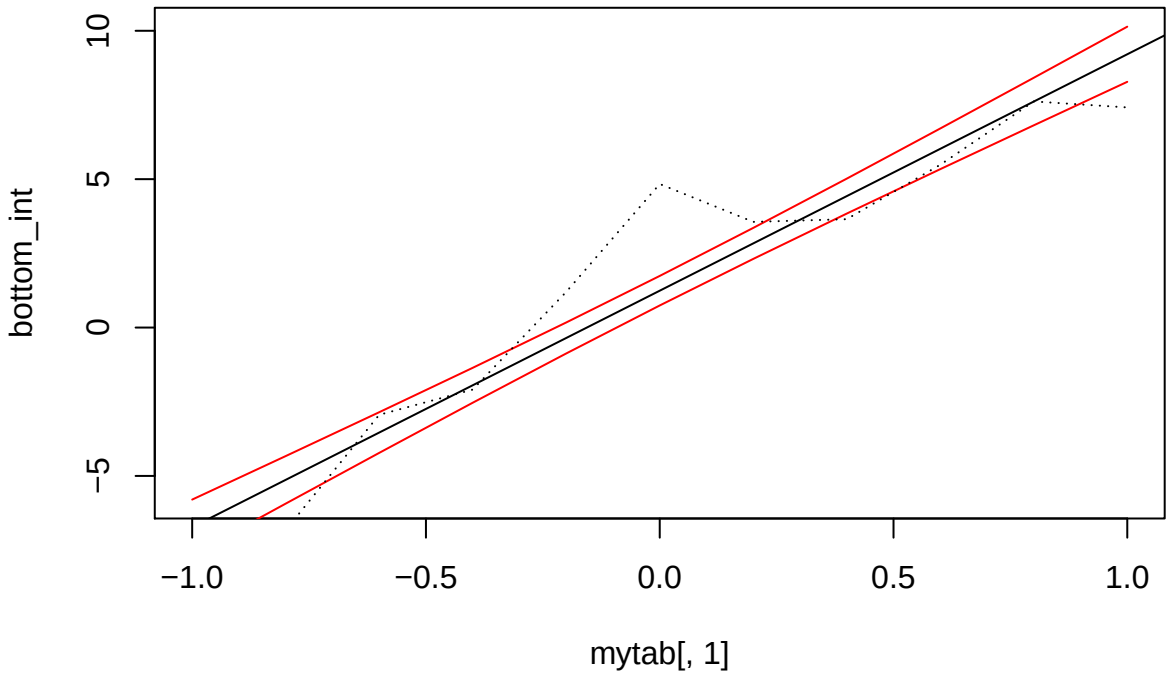

Standard deviation of slopes
sd_slopes
0.0
0.1
0.2
0.3
0.4
0.5
1
2
3
4
5
function_num


Standard deviation of y−intercepts
sd_intercepts
0.00
0.10
0.20
0.30
1
2
3
4
5
function_num






```
## [1] "Covariance between slope and intercept 0.00113030855874168"
## [1] V(f(x)) = 0.091089 + 0.225899x^2 + 0
```



Conclusion