Propagating Monte Carlo Error

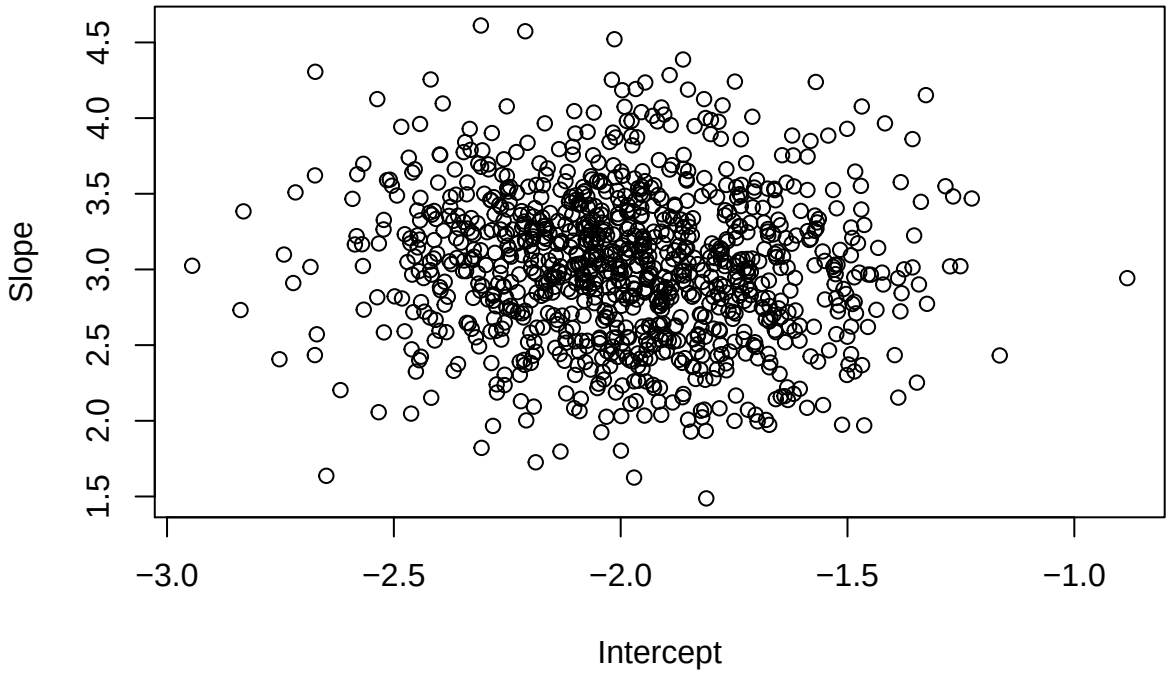
Team A7

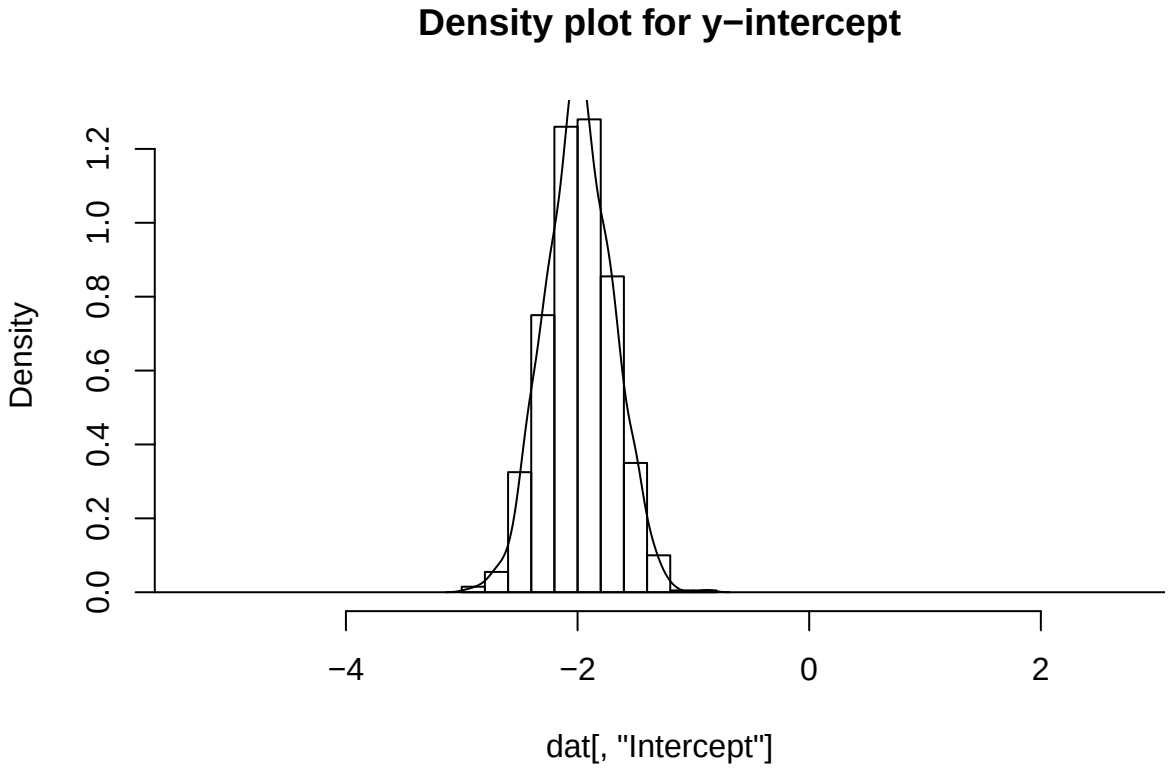
11/29/2018

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

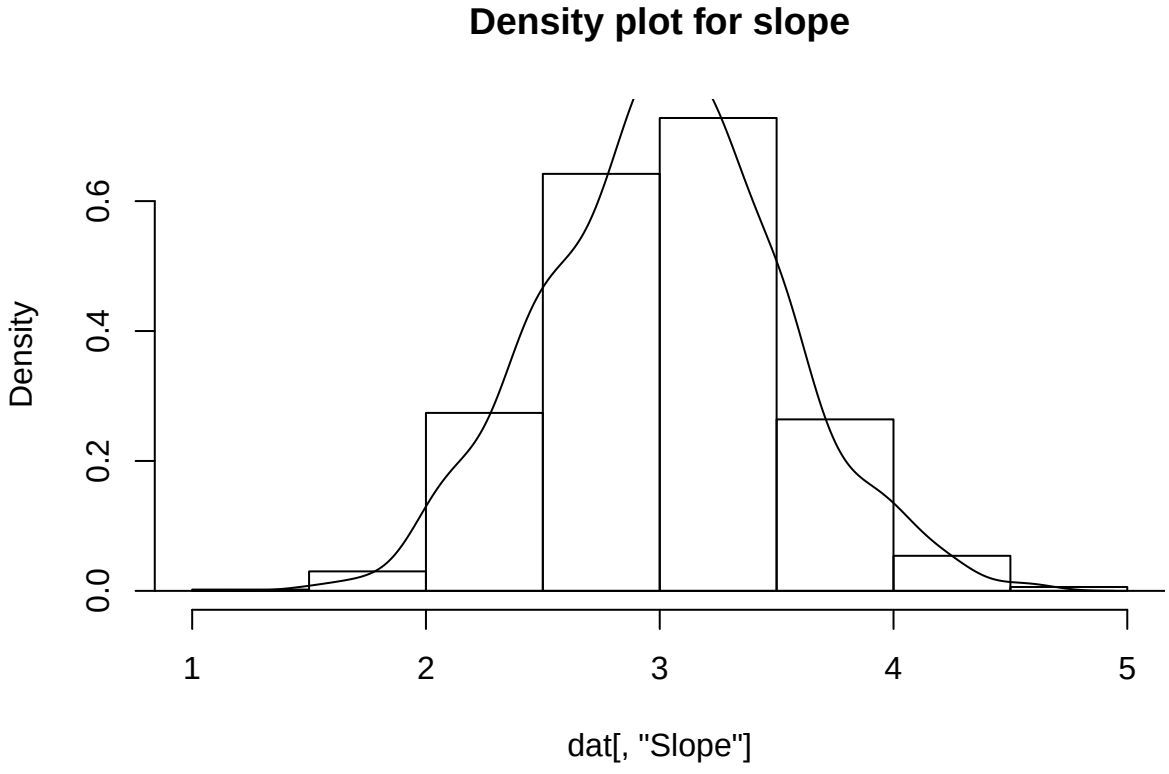
```
f1 <- function(x) -2 + (3*x)
f2 <- function(x) 3
f3 <- function(x) (6*(x**2)) + (3*x) + 3
f4 <- function(x) (10*x) + 3
f5 <- function(x) (-4 * x) - 6

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



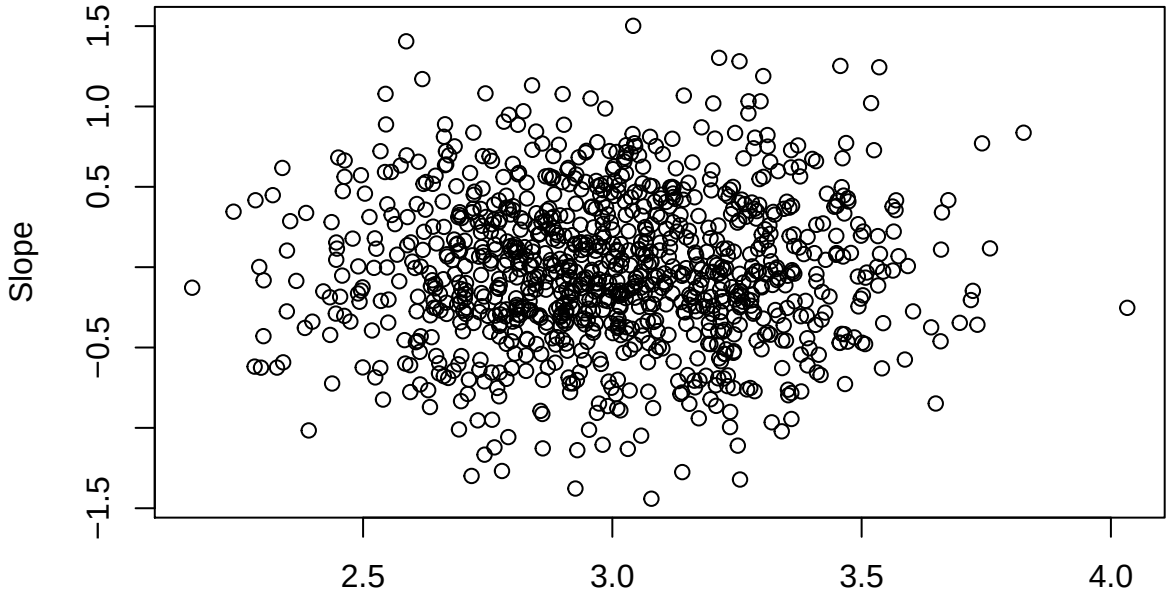



```
## [1] Function number 1
```

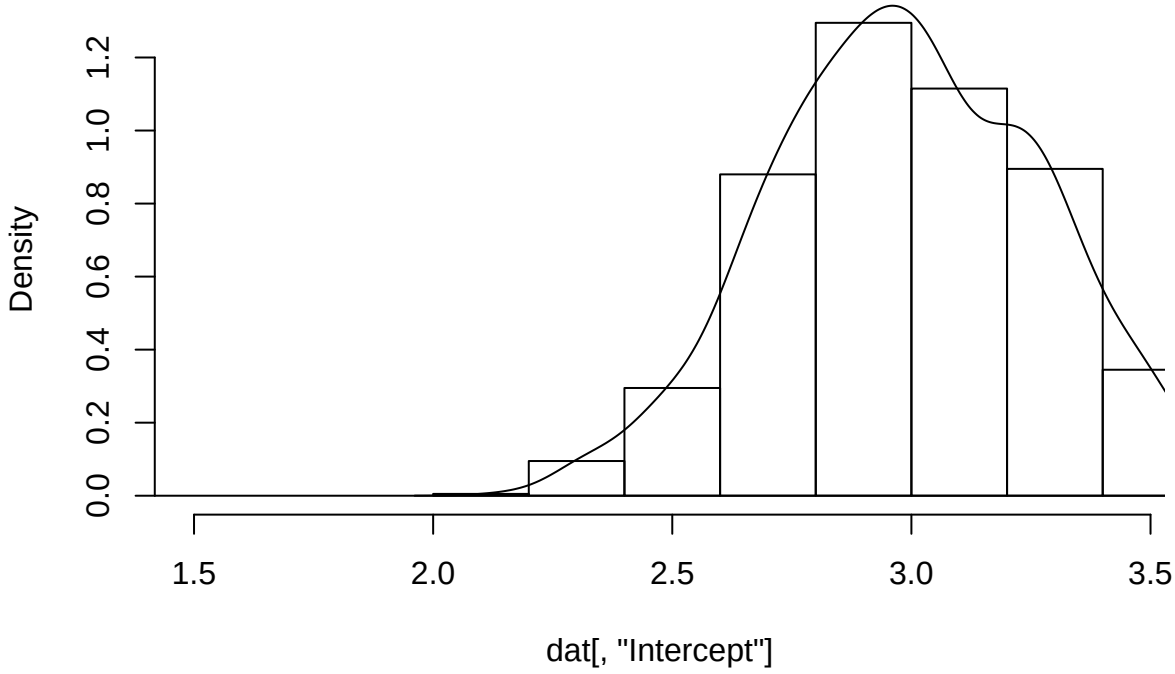



```
## [1] Function number 1
## [1] Mean of the intercept: -1.98583354819919
## [1] Variance of the intercept: 3.02182368946043
```

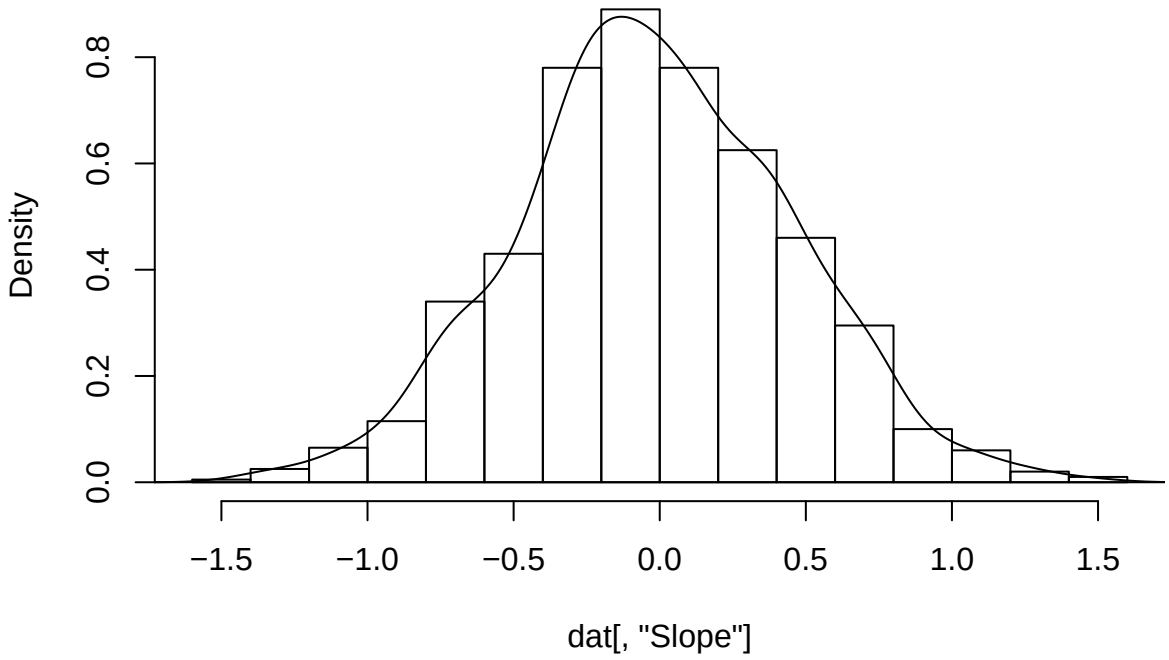
```
## [1] Mean of the slope: 0.499014591019936
## [1] Variance of the slope: 0.28841445054545
## [1]
```



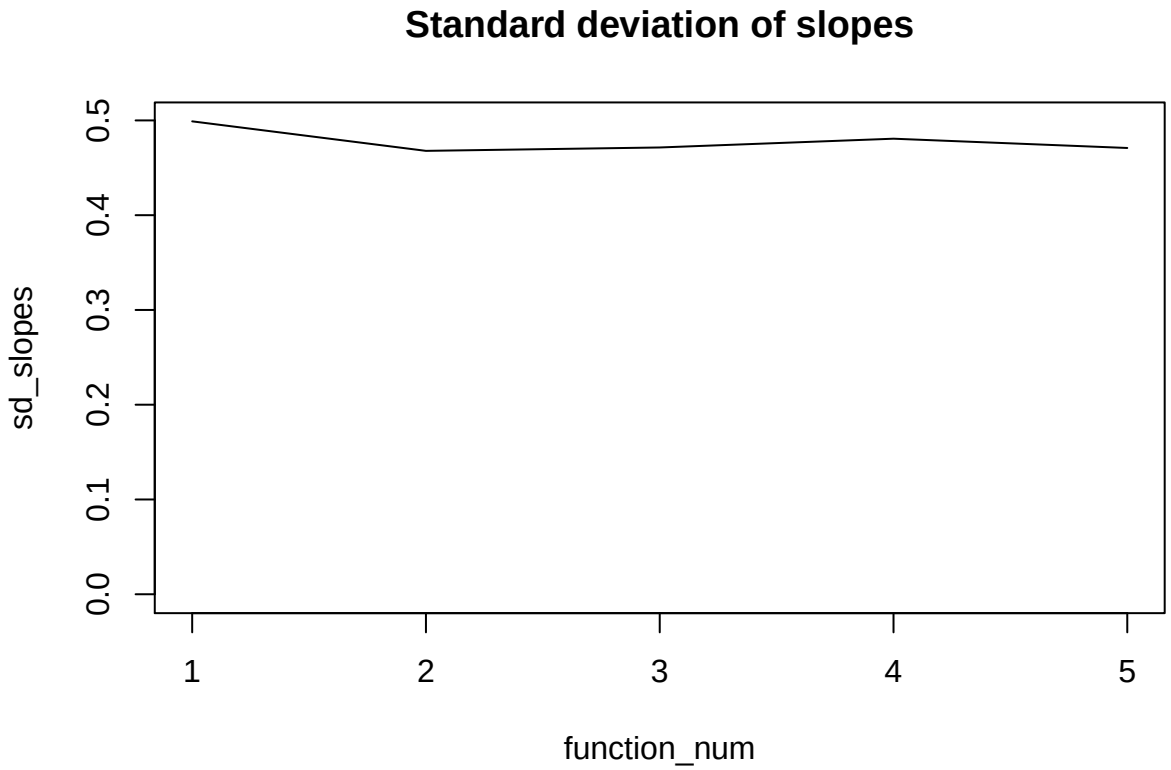
Density plot for y−intercept

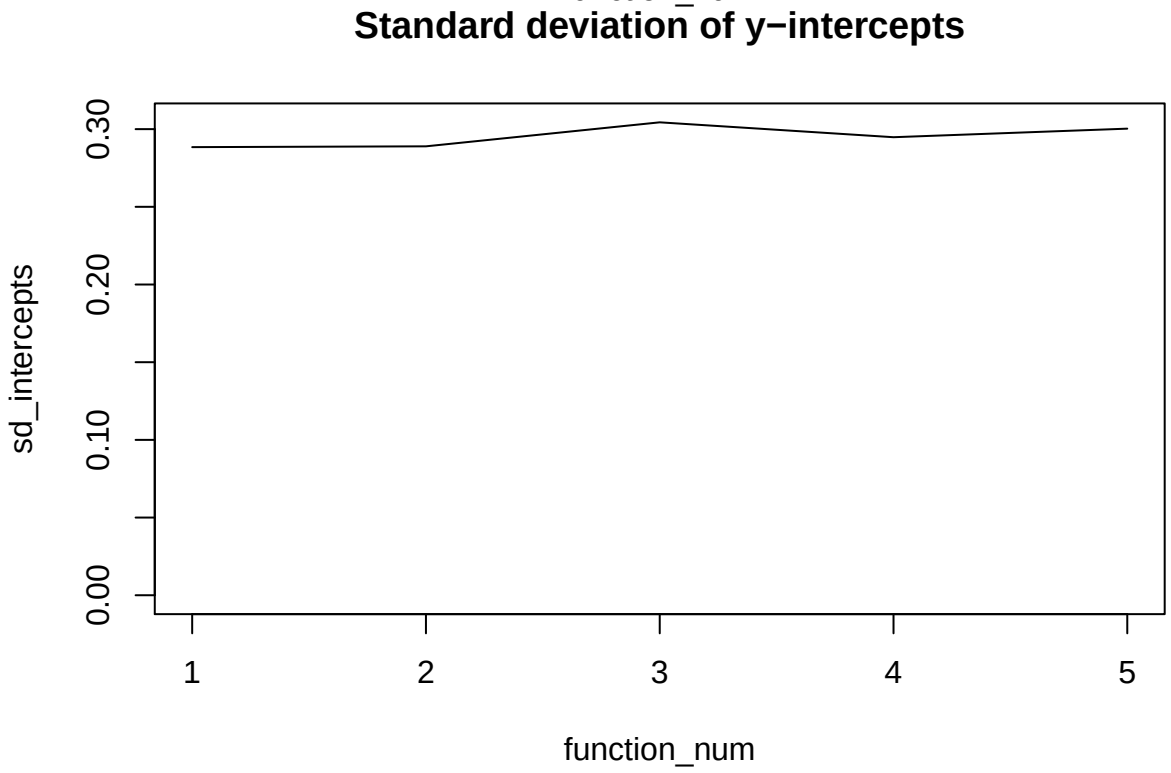


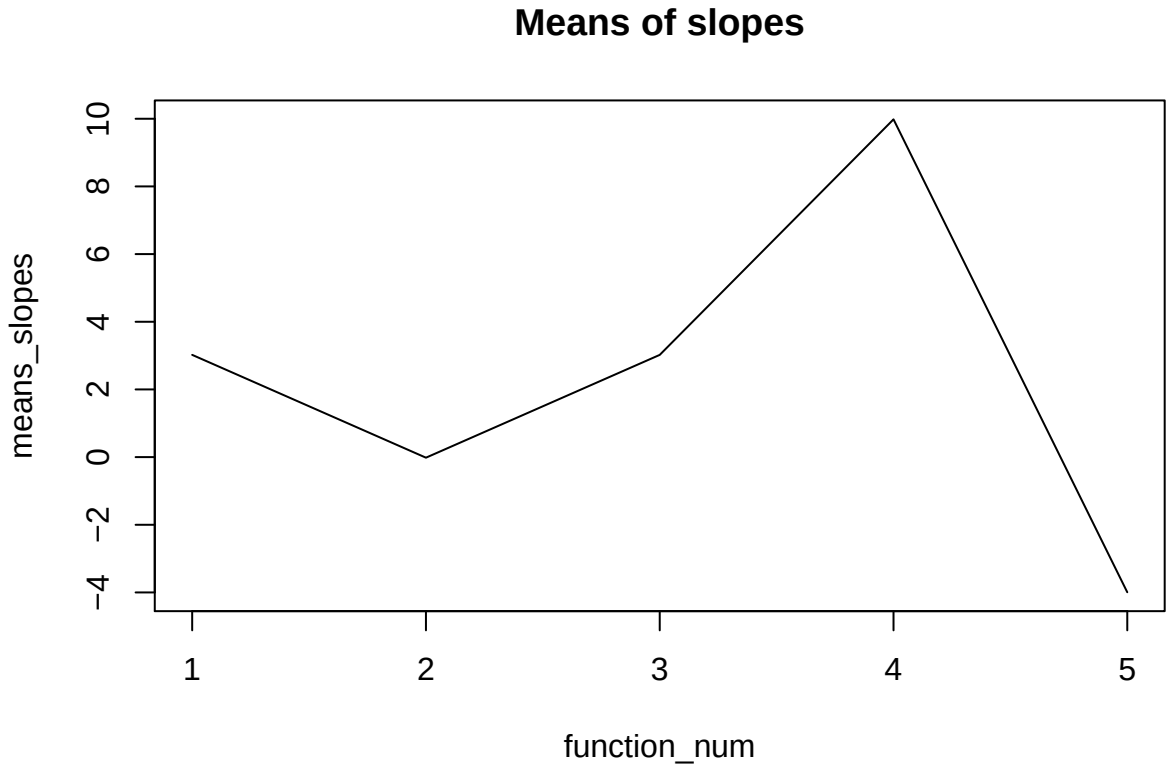

```
## [1] Function number 2
```

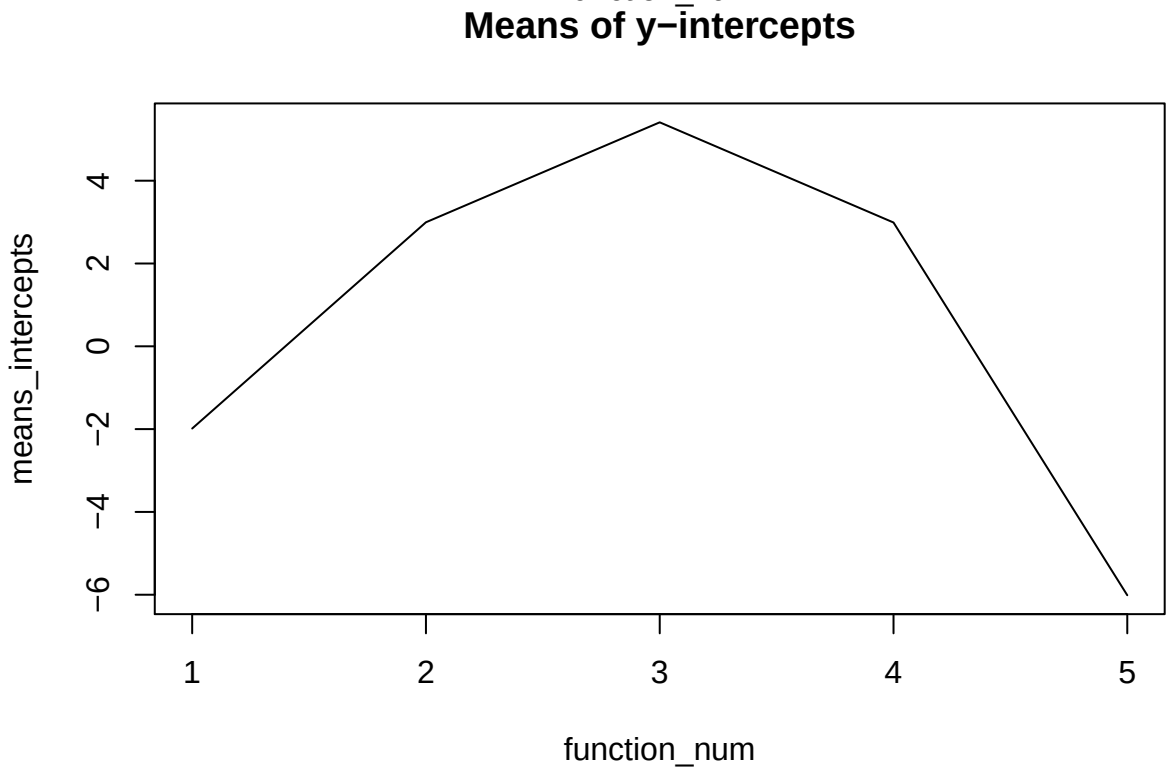



```
## [1] Function number 2
## [1] Mean of the intercept: 2.99571874079284
## [1] Variance of the intercept: -0.0176654141447887
## [1] Mean of the slope: 0.467873543927963
## [1] Variance of the slope: 0.288929405933572
## [1]
## [1] Mean of the intercept: 5.40964722293267
## [1] Variance of the intercept: 3.02054153648091
## [1] Mean of the slope: 0.471454874924808
## [1] Variance of the slope: 0.304378625846823
## [1]
## [1] Mean of the intercept: 2.98994049402363
## [1] Variance of the intercept: 9.98224965833872
## [1] Mean of the slope: 0.480709184873332
## [1] Variance of the slope: 0.29480298140184
## [1]
## [1] Mean of the intercept: -6.01222634329163
## [1] Variance of the intercept: -3.99412241349467
## [1] Mean of the slope: 0.470906367128714
## [1] Variance of the slope: 0.300322403319882
## [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 -0.00404507638507075"
```

```
## [1] 1. V(f(x)) = 0.083183 + 0.249016x^2 + -0.008
## [1] 2. V(f(x)) = 0.08348 + 0.218906x^2 + -0.008
## [1] 3. V(f(x)) = 0.092646 + 0.22227x^2 + -0.008
## [1] 4. V(f(x)) = 0.086909 + 0.231081x^2 + -0.008
```

```
## [1] 5. V(f(x)) = 0.090194 + 0.221753x^2 + -0.008
```

Conclusion