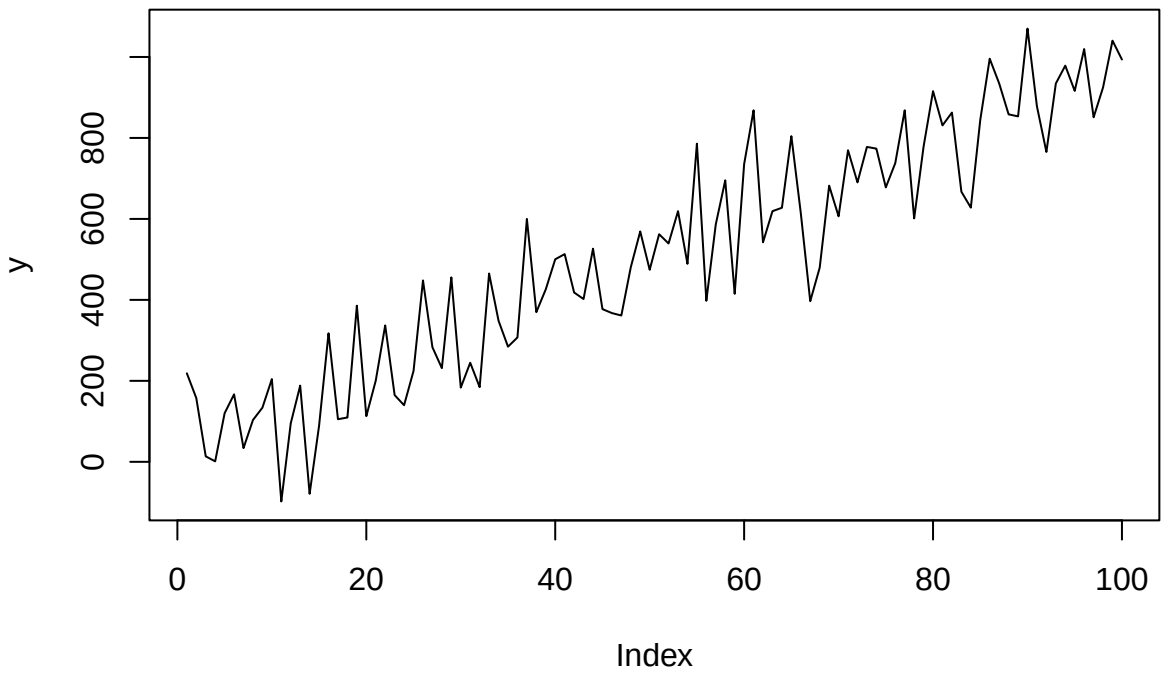
Nov03

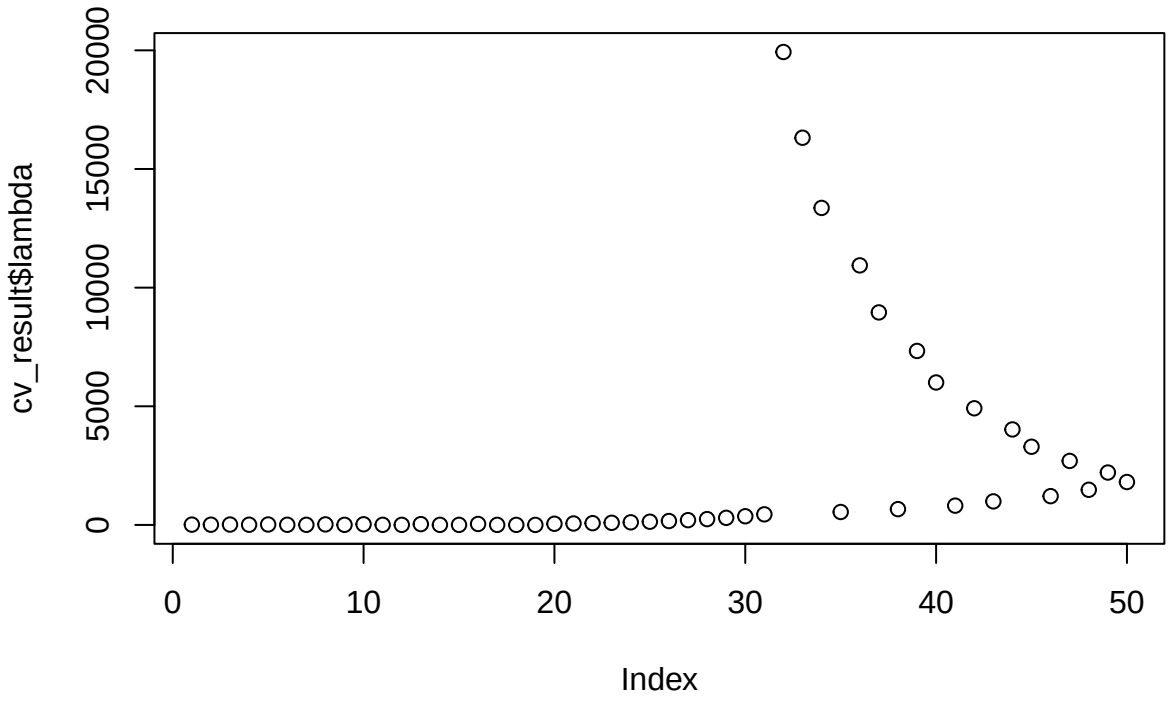
2022-11-04

Gradient descent

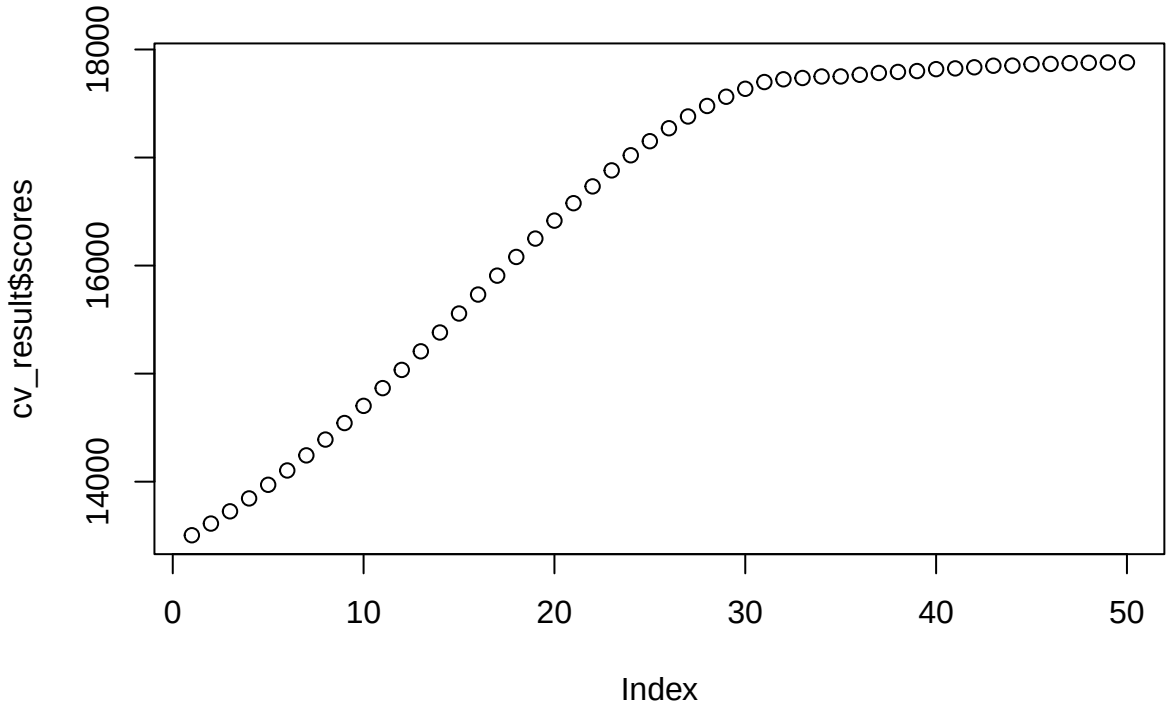
```
source("../model/pls/ridge.R")
set.seed(11121)

dat_length = 100
sd = 100
lambda = 2

x <- 1:dat_length
y <- 10*x + rnorm(dat_length, 0, sd = sd)

plot(y, type = "l")
```



```
cv_result <- CV(x, y)
plot(cv_result$lambda)
```




```
plot(cv_result$scores)
```




```
fit_close <- get_r(x, y, lambda=lambda)
```

```
obj <- function(r, x, y, lambda){
  return(sum((y-r*x)^2) + lambda*sum(diff(r)^2))
}

result = nlm(obj, rep(1, dat_length), x = x, y = y, lambda = lambda)
```

```
lambda
```

```
## [1] 2
```

```
get_loss(x, y, fit_close, lambda)
```

```
## [1] 20164.81
```

```
get_loss(x, y, result$estimate, lambda)
```

```
## [1] 17039.67
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.6     v dplyr   1.0.7
## v tidyr   1.2.0     v stringr 1.4.0
## v readr   2.1.2     v forcats 0.5.1

## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
ggplot(data=data.frame(idx=1:dat_length, closeform = fit_close, gd = result$estimate), aes(x=idx))+
  geom_line(aes(x=idx,y=closeform), color = "blue")+
  geom_line(aes(x=idx,y=fit_close), color = "red", alpha = 0.6)+
  theme_bw()
```