Progress Report

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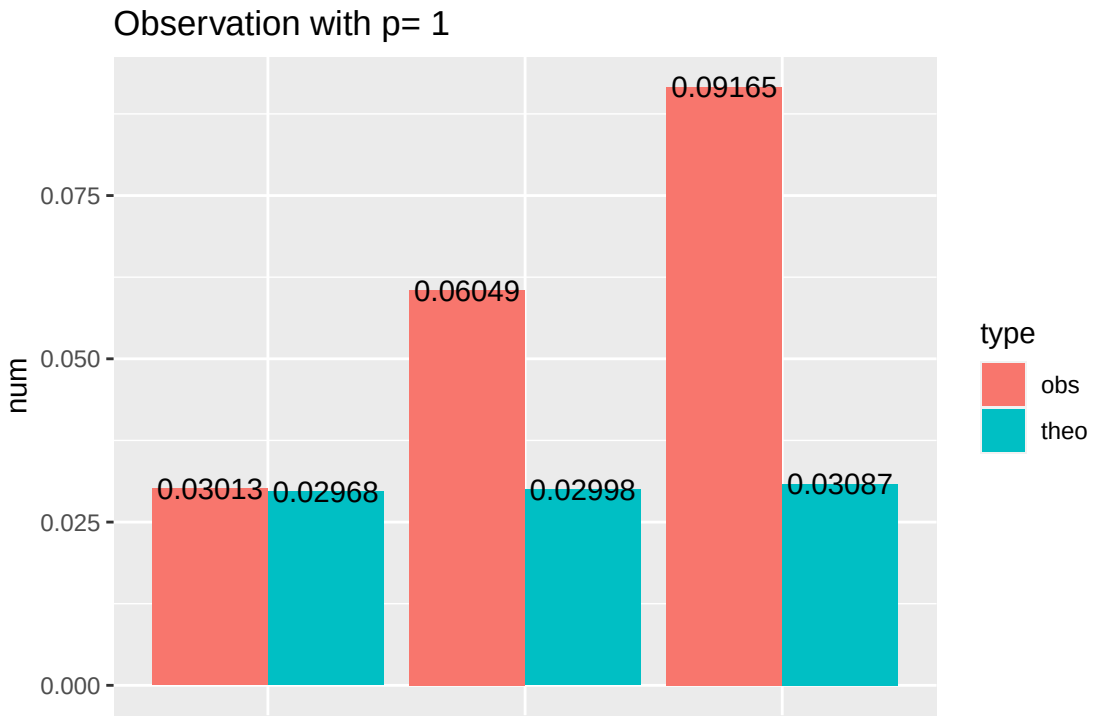
My work so far.

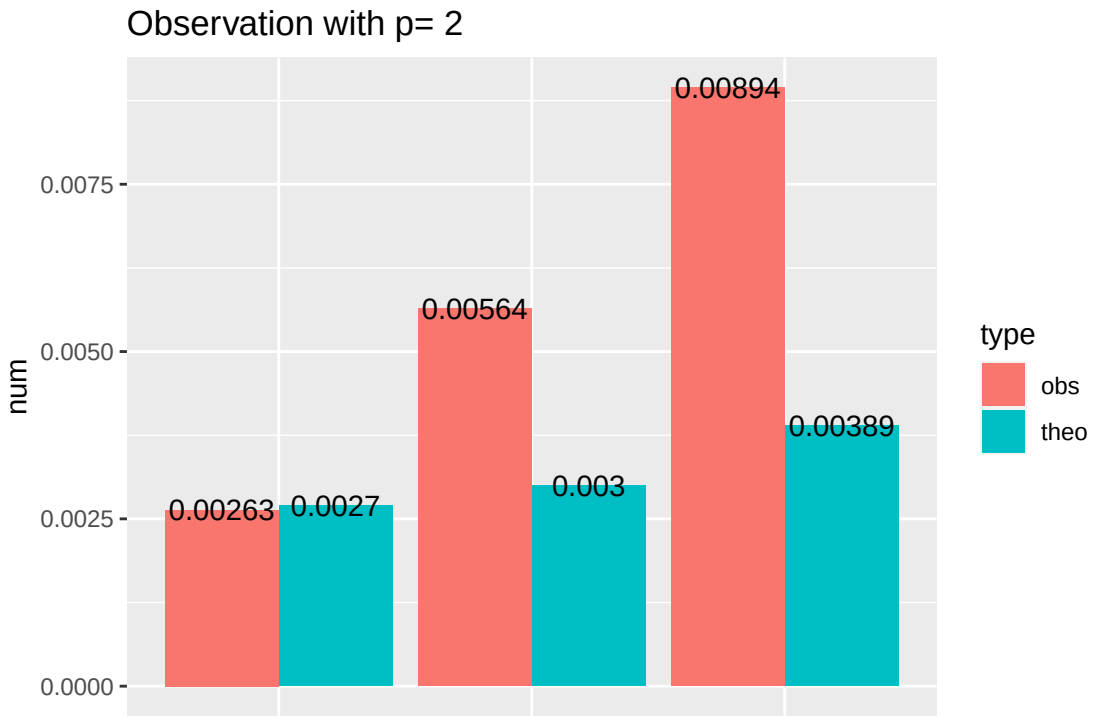
This is still very crude and I will work it further.

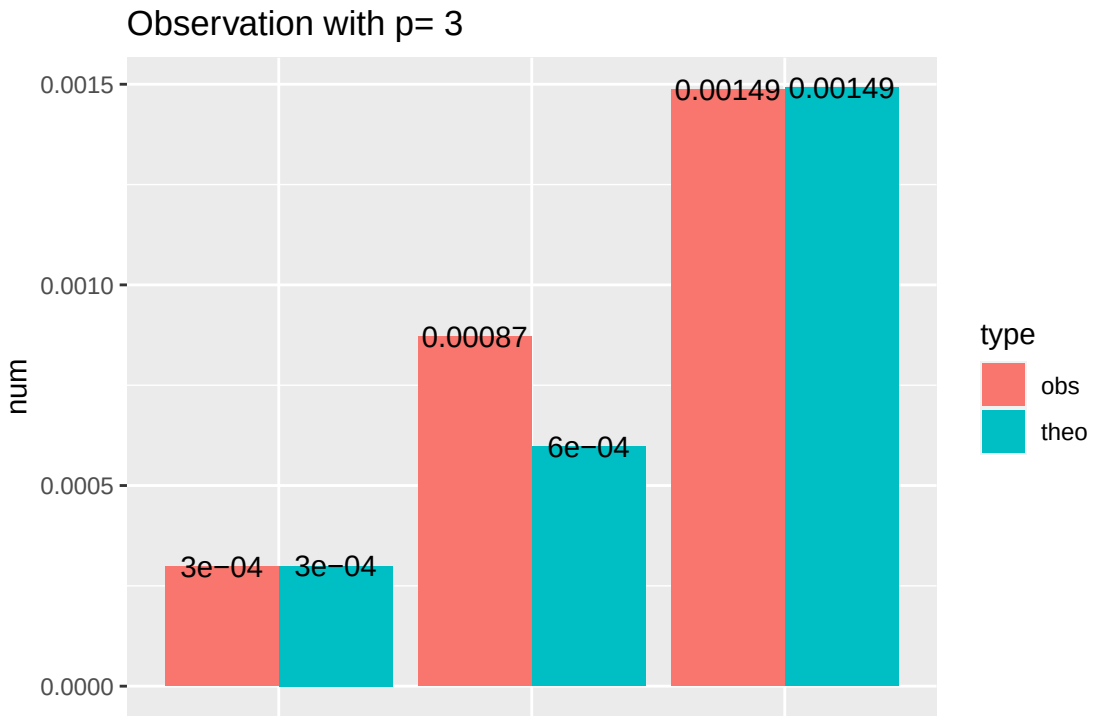
```
source(paste0(here::here(),"/functions/set_para.R", ''))
source(paste0(here::here(),"/functions/pop_gen.R", ''))
source(paste0(here::here(),"/functions/pop_draw.R", ''))
source(paste0(here::here(),"/functions/simulation2.R", ''))
library(tidyverse)
library(kableExtra)
```

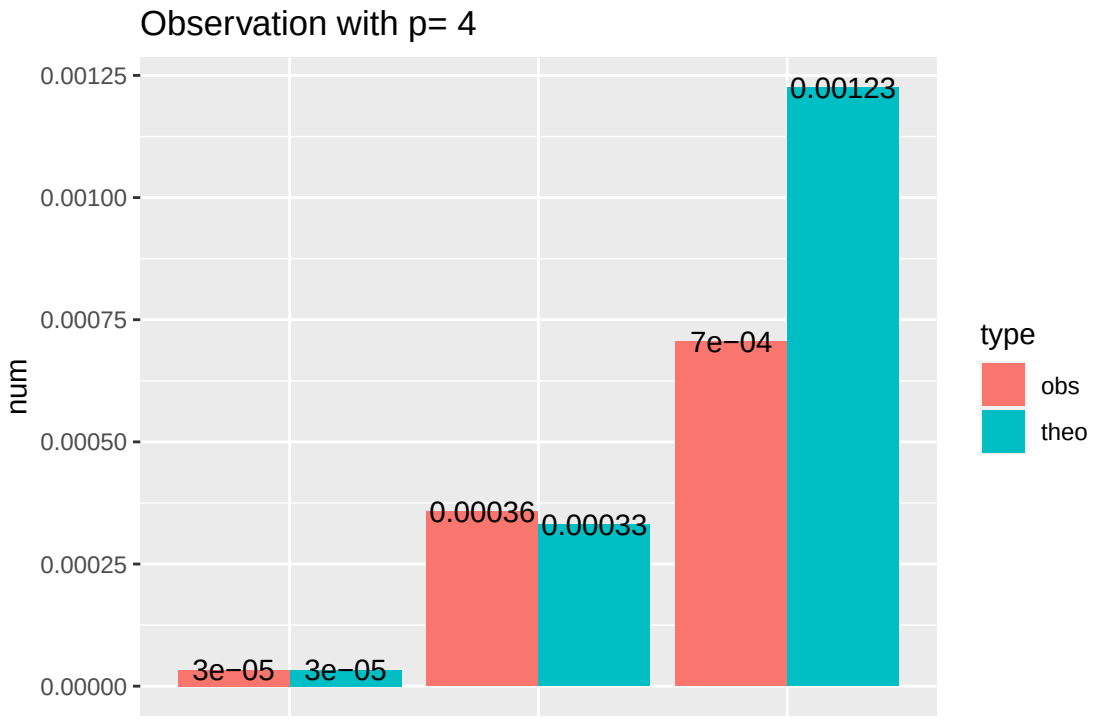
```
start.time<-Sys.time()

sigma_e2<-1
N<-10000
beta<-2


x_para<-set_para(0,1)
e_para<-set_para(0,sigma_e2)

xi<-pop_gen(x_para,N,'uniform')
ei<-pop_gen(e_para,N,'normal')

yi<-xi*beta+ei

nSims<-10000

p<-c(0.01,0.1,0.5,0.9,0.99)
sigma_epi2<-c(0,1,2)

result<-NULL

for (i in c(1:length(p))){
  for (j in c(1:length(sigma_epi2))){
    start.time.small<-Sys.time()
    var_beta<-var(simulation2(yi,xi,p[i],sigma_epi2[j],nSims))
    theo_var<-sigma_epi2[j]**2/(sum(xi**2))+(1-p[i])/p[i]*(sum(xi**2*ei**2))/((sum(xi**2))**2)

    end.time.small<-Sys.time()
    out<-cbind(obs=var_beta,theo=theo_var,prob=sprintf('p = %i ',i),sigma=sprintf('sigma_epi2 = %i',j),
```

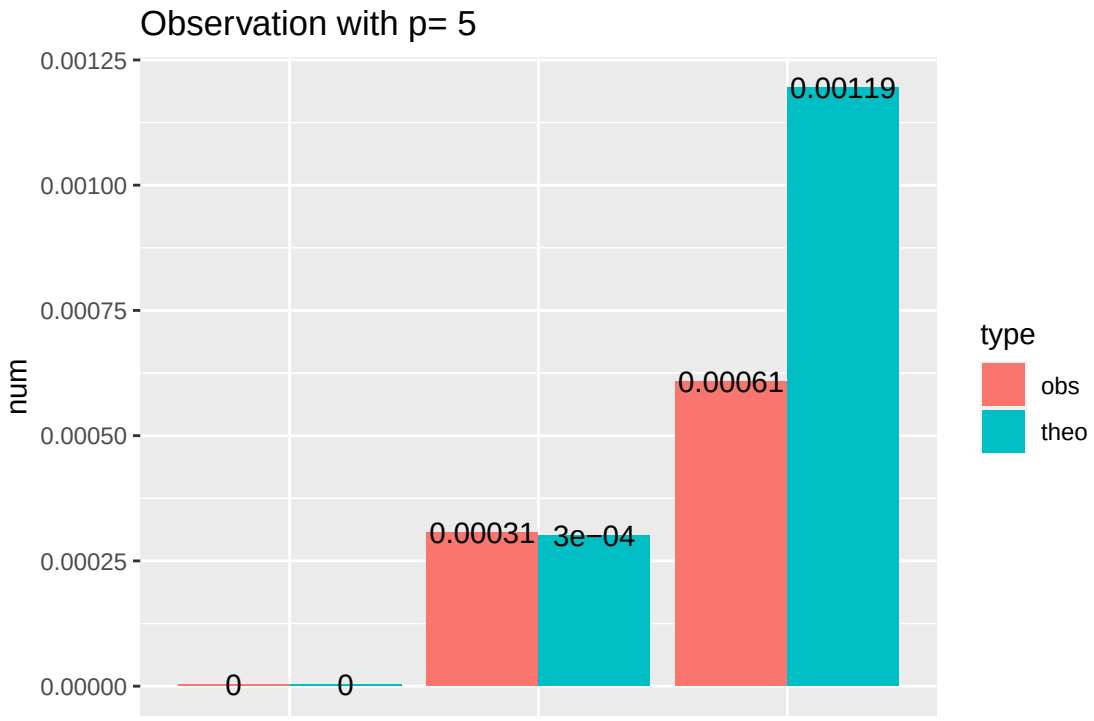
```
    result<-rbind(result,out)
  }
}

result1<-as.data.frame(result) %>% gather(type,num,obs:theo) %>% type_convert()

for (i in (c(1:length(p)))){
a<-ggplot(result1 %>% filter(prob==sprintf('p = %i',i)))+
    geom_col(aes(sigma,num,fill=type),position='dodge',width = 0.9)+
  geom_text(aes(sigma,num,label=round(as.numeric(num),5),fill=type),
            position = position_dodge(width = 0.9))+
  theme(axis.title.x=element_blank(),
        axis.text.x=element_blank(),
        axis.ticks.x=element_blank(),
        plot.margin = unit(c(1,1,1,1), "cm"))+ggtitle(sprintf('Observation with p= %i',i))
plot(a)
}
```




Observation with p= 2
num
0.0075
0.0050
0.0025
0.0000
0.00263
0.0027
0.00564
0.003
0.00894
0.00389
type
obs
theo


Observation with p= 3
num
0.0015
0.0010
0.0005
0.0000
3e−04
3e−04
0.00087
6e−04
0.00149
0.00149
type
obs
theo


Observation with p= 4
num
0.00125
0.00100
0.00075
0.00050
0.00025
0.00000
3e−05
3e−05
0.00036
0.00033
7e−04
0.00123
type
obs
theo




```
end.time<-Sys.time()
```

prob	sigma	time
p = 1	sigma_epi2 = 1	25.6613600254059
p = 1	sigma_epi2 = 2	29.1011519432068
p = 1	sigma_epi2 = 3	29.2909021377563
p = 2	sigma_epi2 = 1	24.9033839702606
p = 2	sigma_epi2 = 2	29.5459940433502
p = 2	sigma_epi2 = 3	29.4386451244354
p = 3	sigma_epi2 = 1	26.3315641880035
p = 3	sigma_epi2 = 2	30.6798188686371
p = 3	sigma_epi2 = 3	30.8614408969879
p = 4	sigma_epi2 = 1	24.9921190738678
p = 4	sigma_epi2 = 2	29.4723041057587
p = 4	sigma_epi2 = 3	29.9081020355225
p = 5	sigma_epi2 = 1	24.4649658203125
p = 5	sigma_epi2 = 2	29.038318157196
p = 5	sigma_epi2 = 3	29.0733530521393
time in total	time in total	7.05857333342234