

STA457tutorial 4

```
set.seed(1221)
sqrt_SSE = c()
R_2 = c()
AIC_ = c()
BIC_ = c()
n = 500
delta = 0.2
time = 1:n
par(mfrow=c(2,2), mar=c(2.5,2.5,0.5,0)+0.5, mgp=c(1.6,0.6,0)) #setup
for (i in 1:50){
  w_b = rnorm(n, 0, sqrt(2))
  y = delta * time + w_b #data
  mu_b = delta*time #true mean function
  fit_b = lm(y~0 + time) #regression
  min_yb = floor(min(y)); max_yb = ceiling(max(y)) #sets y-axis limit

  sqrt_SSE[i] = (sum((fitted(fit_b) - y)^2))^(1/2)
  R_2[i] = 100 * summary(fit_b)$r.squared

  AIC_[i] = AIC(fit_b)
  BIC_[i] = BIC(fit_b)
}

head(sqrt_SSE,5)

## [1] 30.18663 29.18732 31.55859 31.39365 31.66721

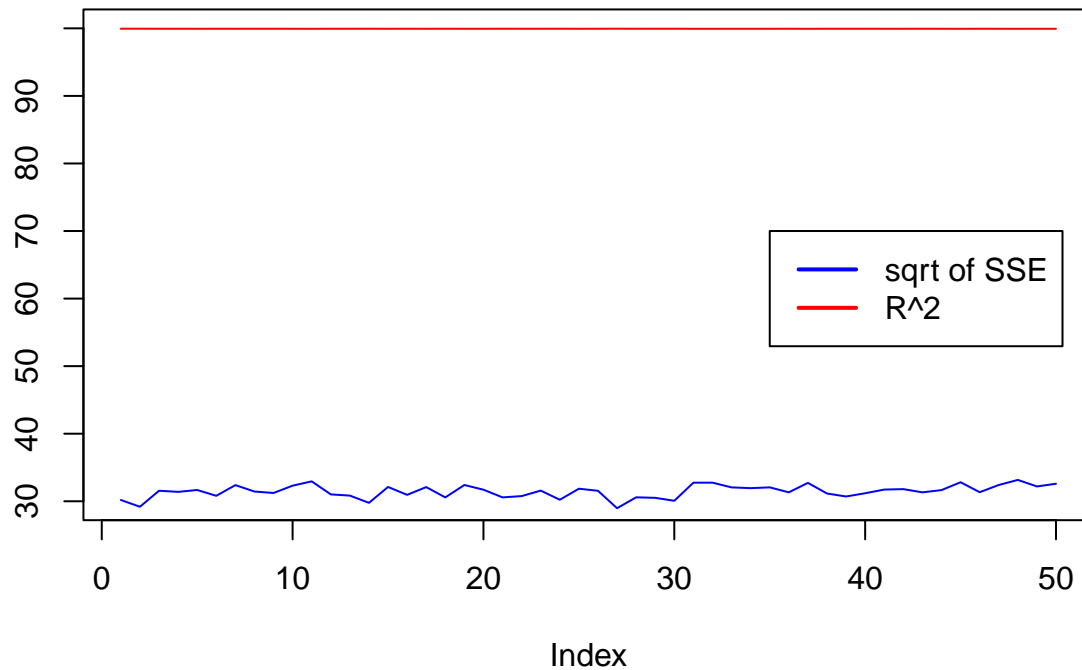
head(R_2,5)

## [1] 99.94547 99.94926 99.94048 99.94084 99.94006

plot(sqrt_SSE,type = "l",main = "square root of SSE and R^2", ylab = "",col = "blue",ylim = c(30,100))
lines(R_2,col = "red")

legend(x = 35, y = 70, # Coordinates
      legend = c("sqrt of SSE", "R^2"),
      lty = c(1, 1),
      col = c("blue", "red"),
      lwd = 2)
```

square root of SSE and R^2



```
head(AIC_,5)
```

```
## [1] 1723.034 1689.369 1767.480 1762.240 1770.916
```

```
head(BIC_,5)
```

```
## [1] 1731.463 1697.798 1775.910 1770.669 1779.345
```

```
plot(AIC_,type = "l",main = "AIC_ and BIC_", ylab = "",col = "blue")  
lines(BIC_,col = "red")
```

```
legend(x = 40, y = 1740, # Coordinates  
       legend = c("AIC", "BIC"),  
       lty = c(1, 1),  
       col = c("blue", "red"),  
       lwd = 2)
```

AIC_ and BIC_

