Homework 1

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tinytex::install_tinytex()

Project 1.

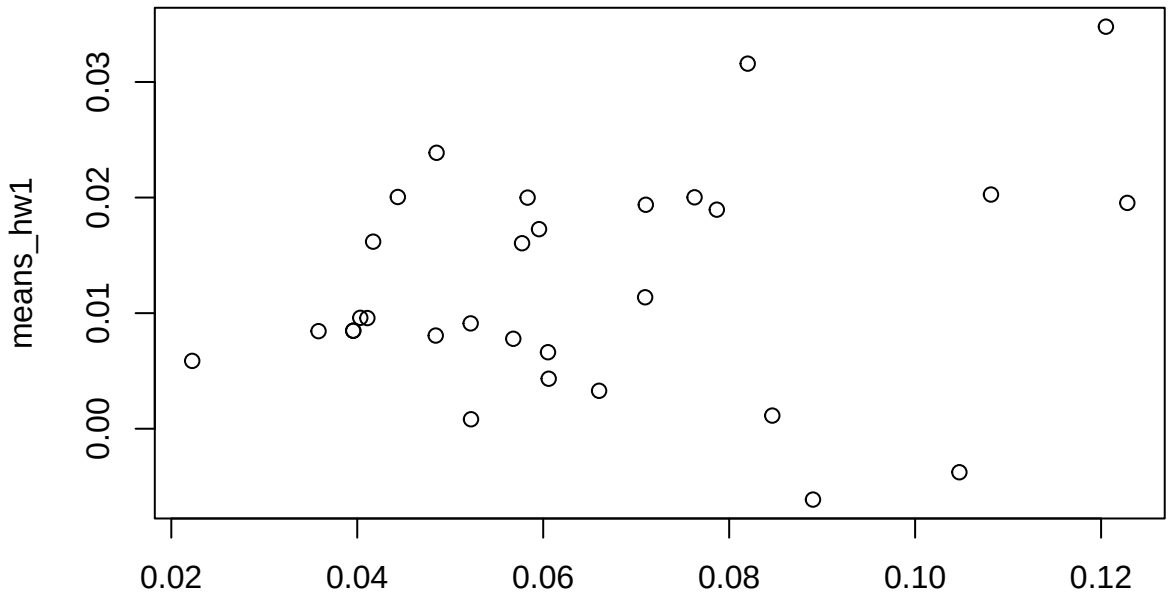
```
hw1 <- read.csv("/Users/user/Desktop/Yonsei/Junior/3-2/Statistical Models in Finance/stockData.csv",
                sep=',', header=T)
```

a, b.

```
r_hw1 <- (hw1[-1, 3:ncol(hw1)]-hw1[-nrow(hw1),3:ncol(hw1)])/hw1[-nrow(hw1),3:ncol(hw1)]

means_hw1 <- colMeans(r_hw1[-1])

covmat_hw1 <- cov(r_hw1[-1])

corrmat_hw1 <- cor(r_hw1[-1])

variances_hw1 <- diag(covmat_hw1)

stdev_hw1 <- diag(covmat_hw1)^(0.5)
```

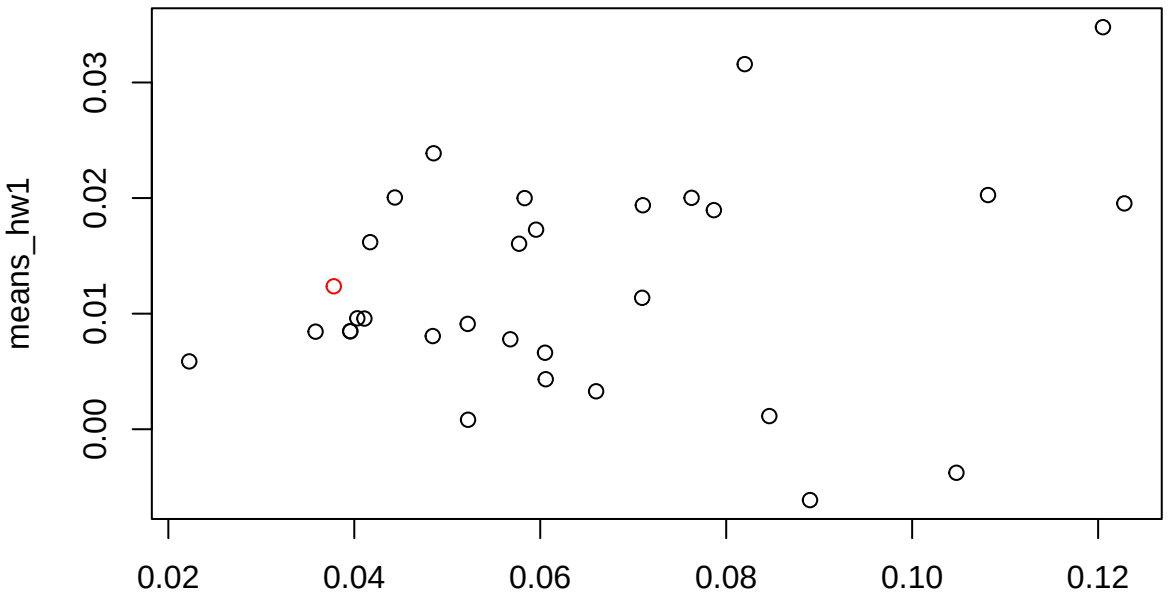
c.

```
plot(stdev_hw1, means_hw1)
```



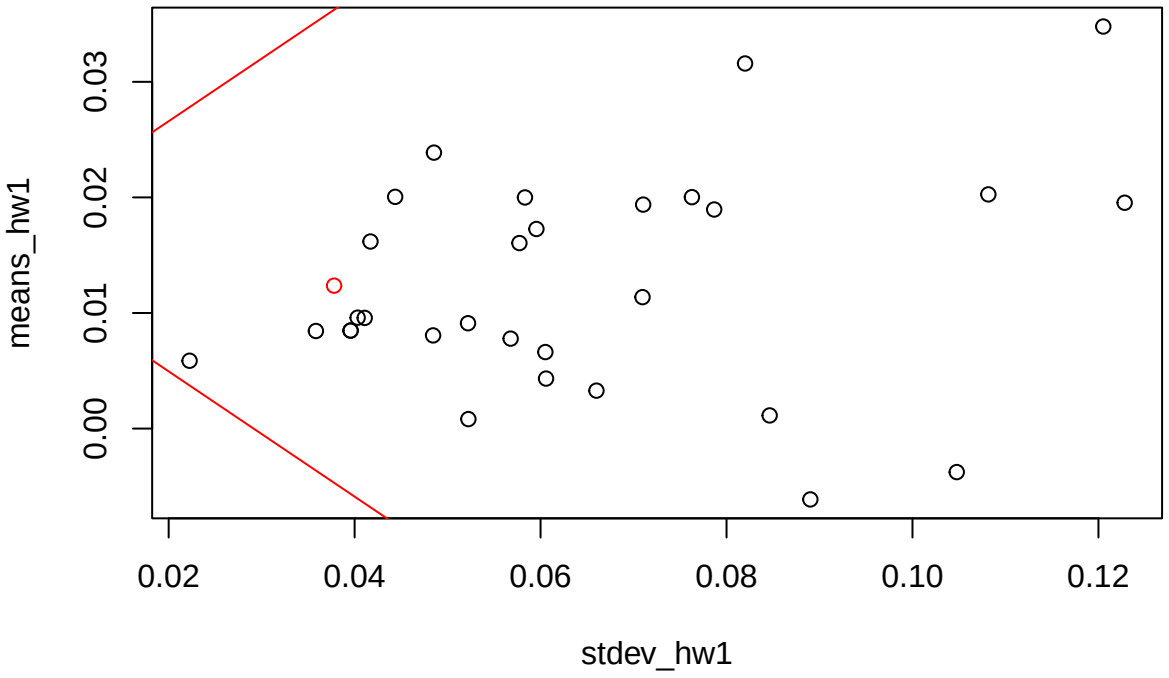
d.

```
equal_means <- mean(means_hw1)

equal_stdev <- (1/(length(r_hw1)-1)*mean(stdev_hw1)^2 + (length(r_hw1)-1)/length(r_hw1)*mean(covmat_hw1)

plot(stdev_hw1, means_hw1)
points(equal_stdev, equal_means, col='red')
```



e.

```r
A_hw1 <- sum(covmat_hw1^(-1) * means_hw1)

B_hw1 <- sum(covmat_hw1^(-1) * means_hw1 * means_hw1)

C_hw1 <- sum(covmat_hw1^(-1))

D_hw1 <- B_hw1 * C_hw1 - A_hw1 * A_hw1

y1_hw1 <- seq(-1, 1, 0.001)

x1_hw1 <- ((C_hw1 * y1_hw1^2 - 2 * A_hw1 * y1_hw1 + B_hw1) / D_hw1)^(1/2)

plot(stdev_hw1, means_hw1)
points(equal_stdev, equal_means, col='red')
lines(x1_hw1, y1_hw1, col='red')
```



f.