Lab\_06

Sunday Okechukwu

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# Question 1

Xm <- matrix(c(1, 4,  
 1, 1,  
 1, 2,  
 1, 3,  
 1, 3,  
 1, 4), ncol = 2, byrow = TRUE)

Ym <- matrix(c(16,  
 5,  
 10,  
 15,  
 13,  
 22), ncol = 1, byrow = TRUE)

t(Ym) %\*% Ym

## [,1]  
## [1,] 1259

t(Xm) %\*% Xm

## [,1] [,2]  
## [1,] 6 17  
## [2,] 17 55

t(Xm) %\*% Ym

## [,1]  
## [1,] 81  
## [2,] 261

# Question 2

R <- matrix(c(25,  
 12), ncol = 1, byrow = TRUE)  
  
Q <- matrix(c(4, 7,  
 2, 3), ncol = 2, byrow = TRUE)

solve(Q)

## [,1] [,2]  
## [1,] -1.5 3.5  
## [2,] 1.0 -2.0

solve(Q)%\*%R

## [,1]  
## [1,] 4.5  
## [2,] 1.0

# Question 3

Xm <- matrix(c(1, 49,  
 1, 69,  
 1, 89,  
 1, 99,  
 1, 109), ncol = 2, byrow = TRUE)

Ym <- matrix(c(124,  
 95,  
 71,  
 45,  
 18), ncol = 1, byrow = TRUE)

A = (XT*X)^-1*XTY

t(Xm) -> transposeXm  
  
transposeXm%\*%Xm-> ProDuct1

det(ProDuct1)

## [1] 11600

solve(ProDuct1)

## [,1] [,2]  
## [1,] 3.16939655 -0.0357758621  
## [2,] -0.03577586 0.0004310345

solve(ProDuct1)%\*%transposeXm%\*%Ym

## [,1]  
## [1,] 211.270690  
## [2,] -1.694828

solve(ProDuct1)%\*%transposeXm%\*%Ym -> interceptandslope  
 interceptandslope

## [,1]  
## [1,] 211.270690  
## [2,] -1.694828

#Fitted values  
 Xm %\*% interceptandslope

## [,1]  
## [1,] 128.22414  
## [2,] 94.32759  
## [3,] 60.43103  
## [4,] 43.48276  
## [5,] 26.53448

#Residuals  
Ym - Xm %\*% interceptandslope

## [,1]  
## [1,] -4.2241379  
## [2,] 0.6724138  
## [3,] 10.5689655  
## [4,] 1.5172414  
## [5,] -8.5344828