MS-E2112 - Multivariate statistical analysis – Home Exercise 1

Srikanth Gadicherla, 546195

January 12, 2015

(a) R function for generating the covariance matrix.

```r
covariance <- function(Input){

  sizeInput = dim(Input)[1]

  meanInput = colMeans(Input)

  modInput = sweep(Input,2,meanInput,"-")

  covInput = (as.matrix(t(modInput)) %*% as.matrix(modInput))/(sizeInput - 1)

  return(covInput)

}

setwd("/home/imsrgadich/Documents/OneDrive/Aalto/Sem3&4/MSA/Ex1")

mydata = read.table("Data1.txt")

cov_mydata = covariance(mydata)
```

(b) R function for generating sqaure root inverse of a matrix.

```r
squareRootInv <- function(matrix){

  eigValues = eigen(matrix)$values

  eigVectors = eigen(matrix)$vectors

  modValues = 1/diag(sqrt(eigValues))

  modValues[modValues == Inf] <- 0

  return(eigVectors %*% modValues %*% t(eigVectors))

}
```

(b) R function for generating the Pearson's correlation matrix.

```r
cov2corr <- function(covariance) {

  invSqrtCov = sqrt(diag(covariance))

  return(covariance / (invSqrtCov %*% t(invSqrtCov)))

}
```