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# Description: MVApcabanki shows a screeplot of the eigenvalues for the PCA of
#             the Swiss bank notes (bank2.dat). It computes the correlations
#             between the variables and the principal components and displays
#             the first two of them.
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# Keywords:   PCA, correlation, eigenvalues, principal components, screeplot
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# clear variables and close windows
rm(list=ls(all=TRUE))
graphics.off()
# setwd("C:/...") #Please change working directory
# load data
x = read.table("SwissBank 1.txt")
n = nrow(x)
# calculates eigenvalues and eigenvectors and sorts them by size
e = eigen((n-1)*cov(x)/n)
e1 = e$values/sum(e$values)

# plot for the relative proportion of variance explained by PCs
dev.new()
plot(e1,ylim=c(0,0.8),xlab="Index",ylab="Variance Explained",main="Swiss Bank
Notes",cex.lab=1.2,cex.axis=1.2,cex.main=1.8)

m = apply(as.matrix(x),2,mean)
temp = as.matrix(x-m)/sqrt(apply(m,2,FUN=sqrt))
r = temp%*%e$vectors
# correlation between PCs and variables
r = cor(cbind(r,x))
# correlation of the two most important PCs and variables
r1 = r[7:12,1:2]

# plot for the correlation of the original variables with the PCs
dev.new()
u.circle=cbind(cos((0:360)/180*pi),sin((0:360)/180*pi))
plot(u.circle,type="l",lty="solid",col="blue",xlab="First PC",ylab="Second PC",main="Swiss Bank
Notes",cex.lab=1.2,cex.axis=1.2,cex.main=1.8,lwd=2)
abline(h=0,v=0)
label=c("X1","X2","X3","X4","X5","X6")
text(r1,label,cex=1.2)

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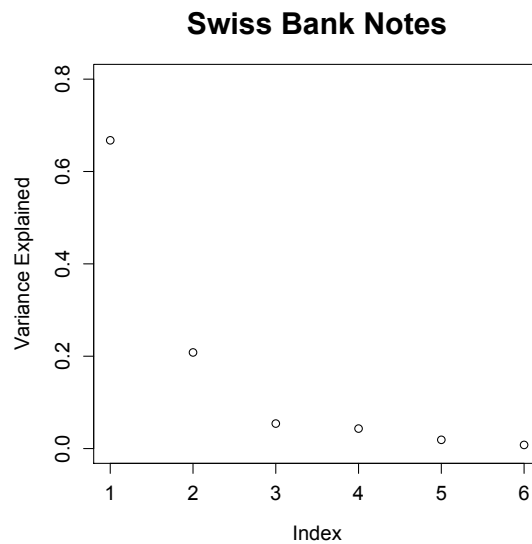


Figura D

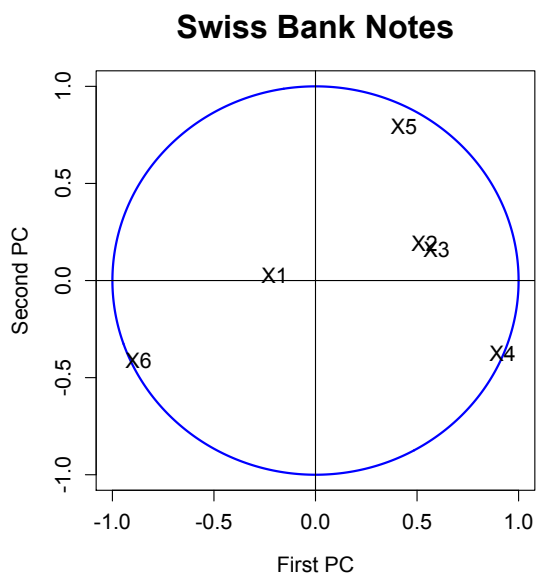


Figura E