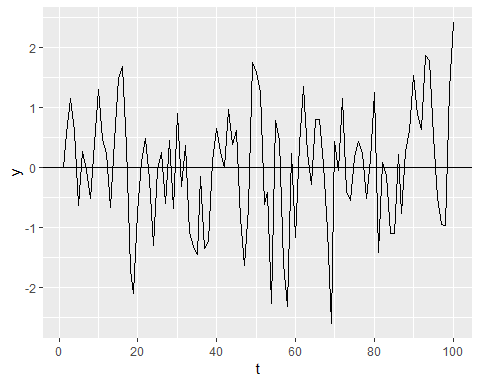
chapter\_6\_R\_intro.R

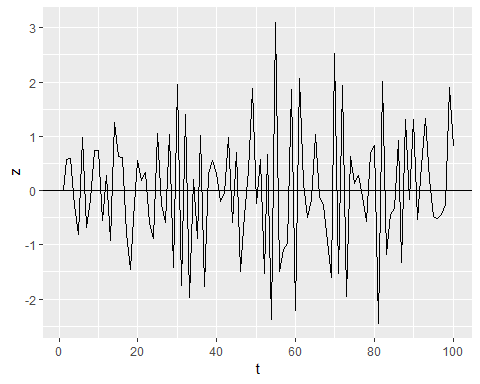
RYU

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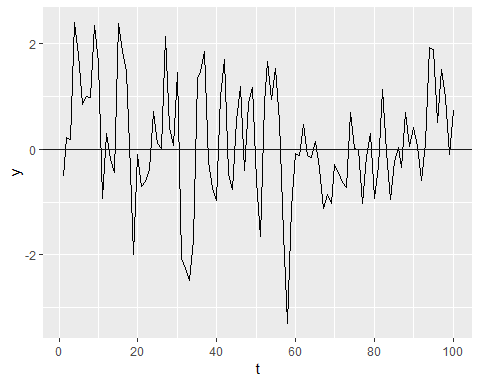
library(ggplot2)  
  
#figure 6.1  
t <- 1:100  
a <- rnorm(100)  
z <- rep(0, 100)  
y <- rep(0, 100)  
for(i in 1:99) {  
 z[i+1] <- -0.5\*z[i] + a[i];  
 y[i+1] <- 0.5\*y[i] + a[i];  
}  
  
df <- data.frame(t,z,y)  
  
ggplot(aes(x=t), data=df) +   
 geom\_line(aes(y=y)) +   
 scale\_x\_continuous(breaks = seq(0, 100, by = 20)) +  
 geom\_hline(yintercept=0)



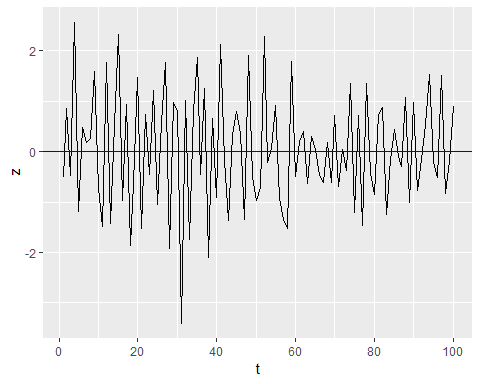
ggplot(aes(x=t), data=df) +   
 geom\_line(aes(y=z)) +   
 scale\_x\_continuous(breaks = seq(0, 100, by = 20)) +  
 geom\_hline(yintercept=0)



#figure 6.6  
t <- 1:100  
a1 <- 0  
z <- rep(0, 100)  
y <- rep(0, 100)  
for(i in 1:100) {  
 a <- rnorm(1)  
 z[i] <- a-0.6\*a1  
 y[i] <- a+0.6\*a1  
 a1 <- a  
}  
  
df <- data.frame(t,z,y)  
  
ggplot(aes(x=t), data=df) +   
 geom\_line(aes(y=y)) +   
 scale\_x\_continuous(breaks = seq(0, 100, by = 20)) +  
 geom\_hline(yintercept=0, color="grey10")



ggplot(aes(x=t), data=df) +   
 geom\_line(aes(y=z)) +   
 scale\_x\_continuous(breaks = seq(0, 100, by = 20)) +  
 geom\_hline(yintercept=0, color="grey10")



#figure 6.4  
testplot <- function(df, mode='acf'){  
   
 if(mode=='acf') {  
 if(!is.null(df$acf)) {  
 ylegend <- "ACF"  
 gplt <- ggplot(data=df, aes(x=lag, y=acf))  
 }  
 }  
 else if(mode=='pacf') {  
 if(!is.null(df$pacf)) {  
 ylegend <- "PACF"  
 gplt <- ggplot(data=df, aes(x=lag, y=pacf))  
 }  
 }  
 else {  
 stop('Given data frame must have acf or pacf')  
 }  
   
 gplt +   
 geom\_hline(yintercept=0) +  
 geom\_hline(yintercept=0.5, color="blue", linetype="dashed") +   
 geom\_hline(yintercept=-0.5, color="blue", linetype="dashed") +   
 geom\_segment(aes(xend=df$lag, yend=0), size=2, color="darkgreen") +   
 xlab("Lag") +  
 ylab(ylegend) +   
 scale\_x\_continuous(breaks = seq(0, length(df$lag), by = 1)) +  
 scale\_y\_continuous(limits=c(-1,1), breaks = seq(-1, 1, by=0.2))  
}  
  
fig6\_4 <- function(phi, mode='acf') {  
 k <- 0:10  
 acf <- phi\*\*k  
 pacf <- rep(0, 11)  
 pacf[2] <- phi  
 df <- data.frame(acf, pacf, lag=k)  
 testplot(df, mode)  
}  
  
fig6\_4(0.6, 'acf')

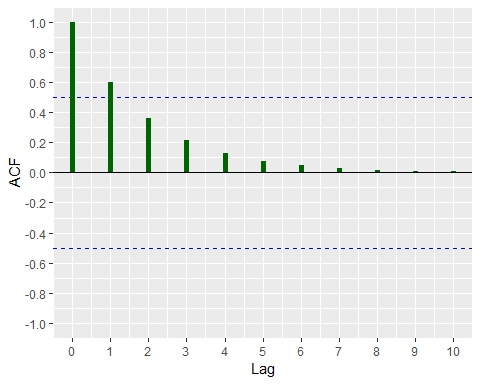


fig6\_4(0.6, 'pacf')

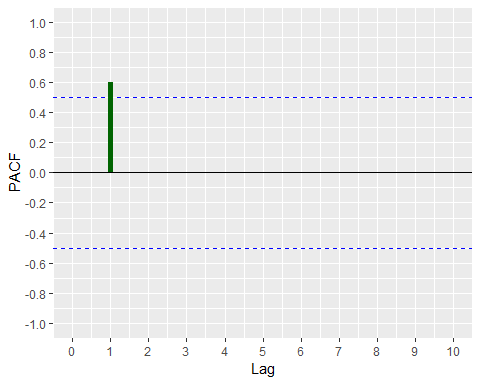


fig6\_4(-0.6, 'acf')

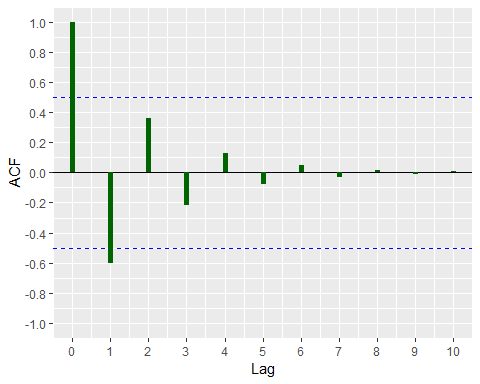
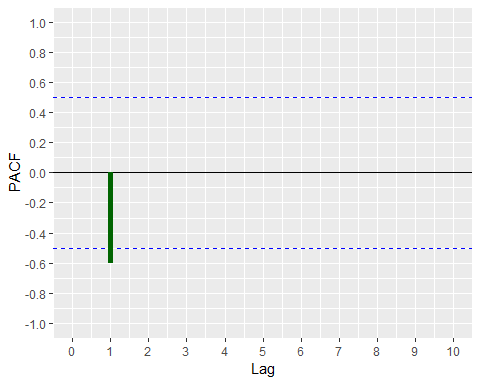


fig6\_4(-0.6, 'pacf')



#figure 6.5  
fig6\_5 <- function(phi1, phi2, mode='acf') {  
 k <- 0:10  
 acf <- rep(0, 11)  
 pacf <- rep(0, 11)  
 acf[1] <- 1  
 acf[2] <- phi1/(1-phi2)  
 acf[3] <- (phi1\*\*2+phi2-phi2\*\*2)/(1-phi2)  
 pacf[2] <- acf[2]  
 pacf[3] <- phi2  
 for(i in 3:10) {  
 acf[i+1] <- phi1\*acf[i]+phi2\*acf[i-1]  
 }  
 df <- data.frame(acf, pacf, lag=k)  
 testplot(df, mode)  
}  
  
fig6\_5(-0.8, -0.7, 'acf')

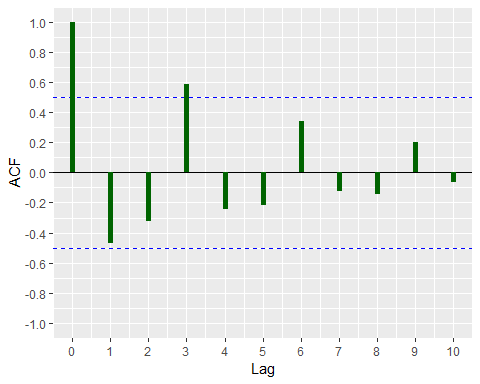


fig6\_5(-0.8, -0.7, 'pacf')

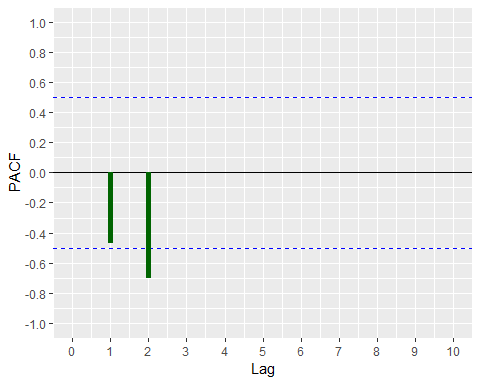


fig6\_5(-0.5, 0.2, 'acf')

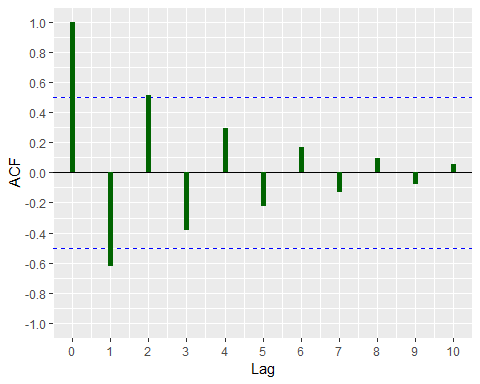


fig6\_5(-0.5, 0.2, 'pacf')

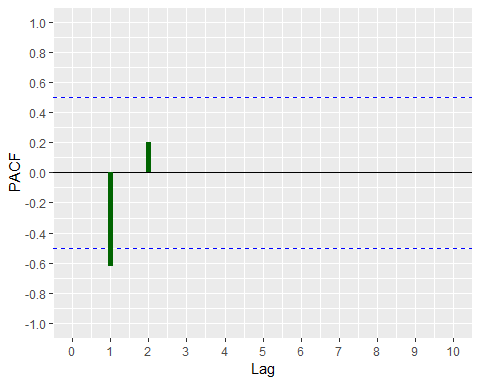


fig6\_5(0.7, 0.2, 'acf')

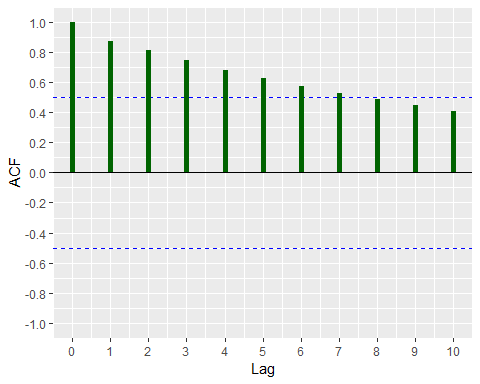


fig6\_5(0.7, 0.2, 'pacf')

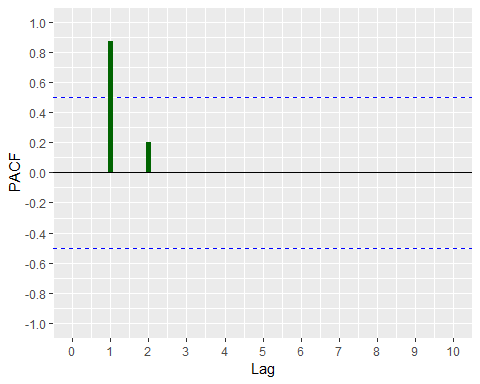


fig6\_5(1.3, -0.5, 'acf')

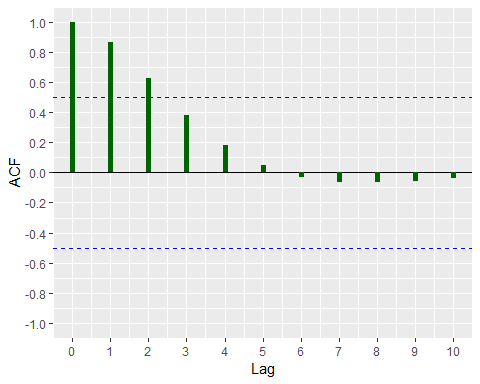
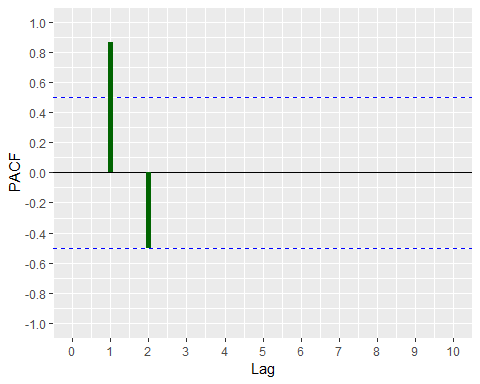


fig6\_5(1.3, -0.5, 'pacf')



#figure 6.8  
fig6\_8 <- function(theta, mode='acf') {  
 k <- 0:10  
 kk <- 2\*(k+1)  
 acf <- rep(0, 11)  
 pacf <- rep(0, 11)  
 acf[1] <- 1  
 acf[2] <- -theta/(1+theta\*\*2)  
 pacf <- -(theta\*\*k)\*(1-theta\*\*2)/(1-theta\*\*kk)  
   
 df <- data.frame(acf, pacf, lag=k)  
 testplot(df, mode)  
}  
  
fig6\_8(0.9, 'acf')

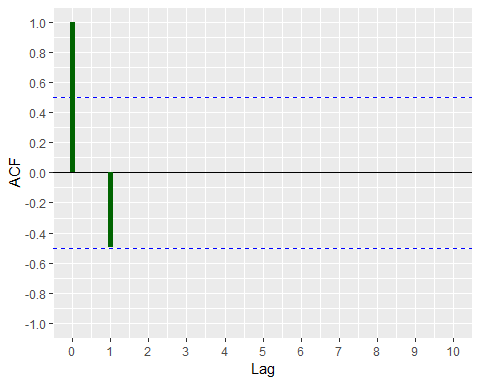


fig6\_8(0.9, 'pacf')

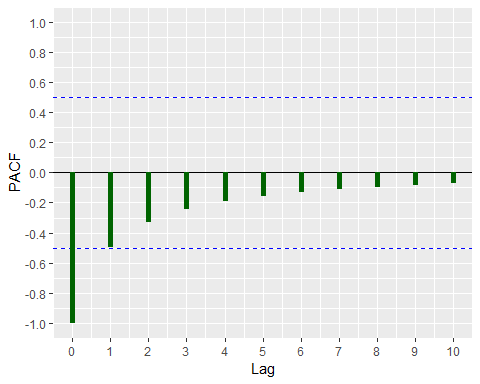


fig6\_8(-0.6, 'acf')

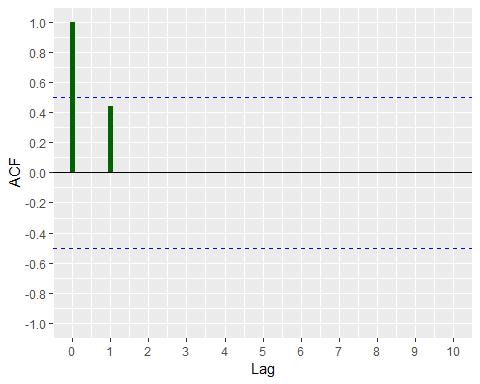
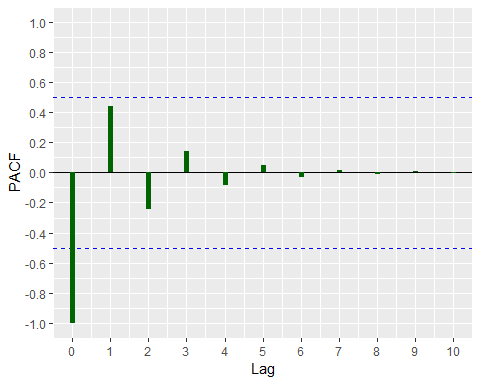


fig6\_8(-0.6, 'pacf')



#figure 6.9  
fig6\_9 <- function(theta1, theta2, mode) {  
 k <- 0:10  
 acf <- rep(0, 11)  
 pacf <- rep(0, 11)  
 acf[1] <- 1  
 acf[2] <- -theta1\*(1-theta2)/(1+theta1\*\*2+theta2\*\*2)  
 acf[3] <- -theta2/(1+theta1\*\*2+theta2\*\*2)  
   
 df <- data.frame(acf, lag=k)  
 testplot(df, mode)  
}  
  
fig6\_9(-1.6, -0.7, 'acf')

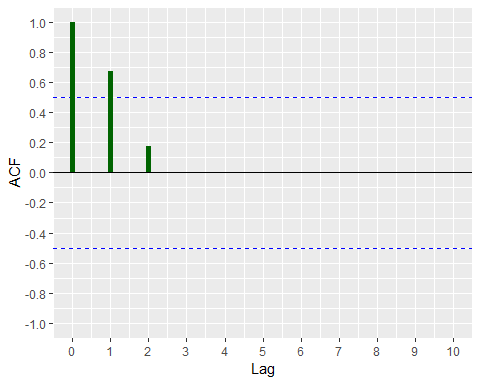
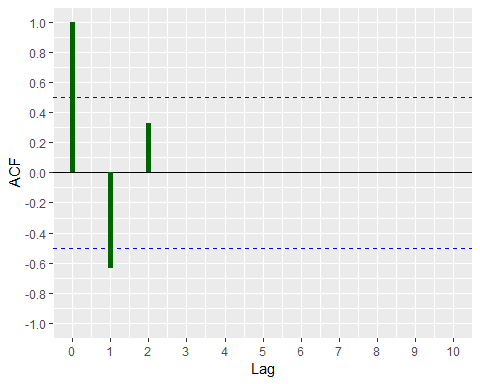


fig6\_9(0.8, -0.7, 'acf')



#figure 6.10  
fig6\_10 <- function(phi, theta, mode) {  
 k <- 0:10  
 acf <- rep(0, 11)  
 pacf <- rep(0, 11)  
 acf[1] <- 1  
 acf[2] <- (phi-theta)\*(1-phi\*theta)/(1+theta\*\*2-2\*phi\*theta)  
 for(i in 2:10) {  
 acf[i+1] <- phi\*acf[i]  
 }  
 df <- data.frame(acf, lag=k)  
 testplot(df, mode)  
}  
  
fig6\_10(-0.9, -0.5, 'acf')

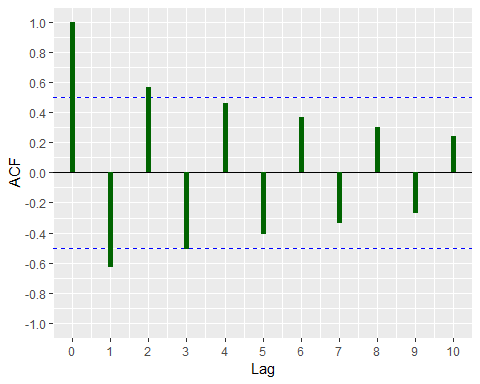


fig6\_10(0.8, -0.7, 'acf')

