

PSTAT 174 HW.3 Q6

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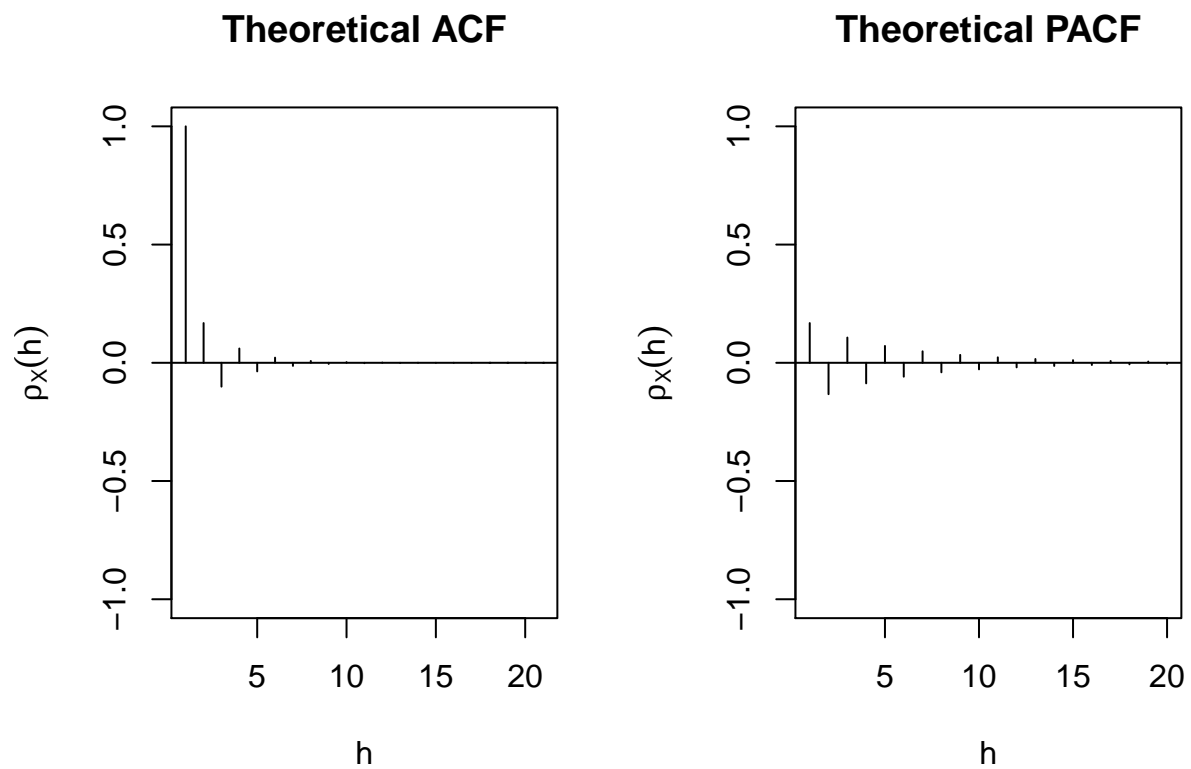
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Creating the ARMA models for part a and b

```
set.seed(100)
q6.a=arima.sim(model=list(ar=c(-.6),ma=c(1.2)),n=100)
q6.b=arima.sim(model=list(ar=c(-.2,.48)),n=100)
q6.a.theo.acf=ARMAacf(ar=c(-.6),ma=c(1.2),lag.max = 20,pacf=F)
q6.b.theo.acf=ARMAacf(ar=c(-.2,.48),lag.max = 20,pacf = F)
q6.a.theo.pacf=ARMAacf(ar=c(-.6),ma=c(1.2),lag.max = 20,pacf=T)
q6.b.theo.pacf=ARMAacf(ar=c(-.2,.48),lag.max = 20,pacf = T)
```

Q6.a Theoretical ACF and PACF

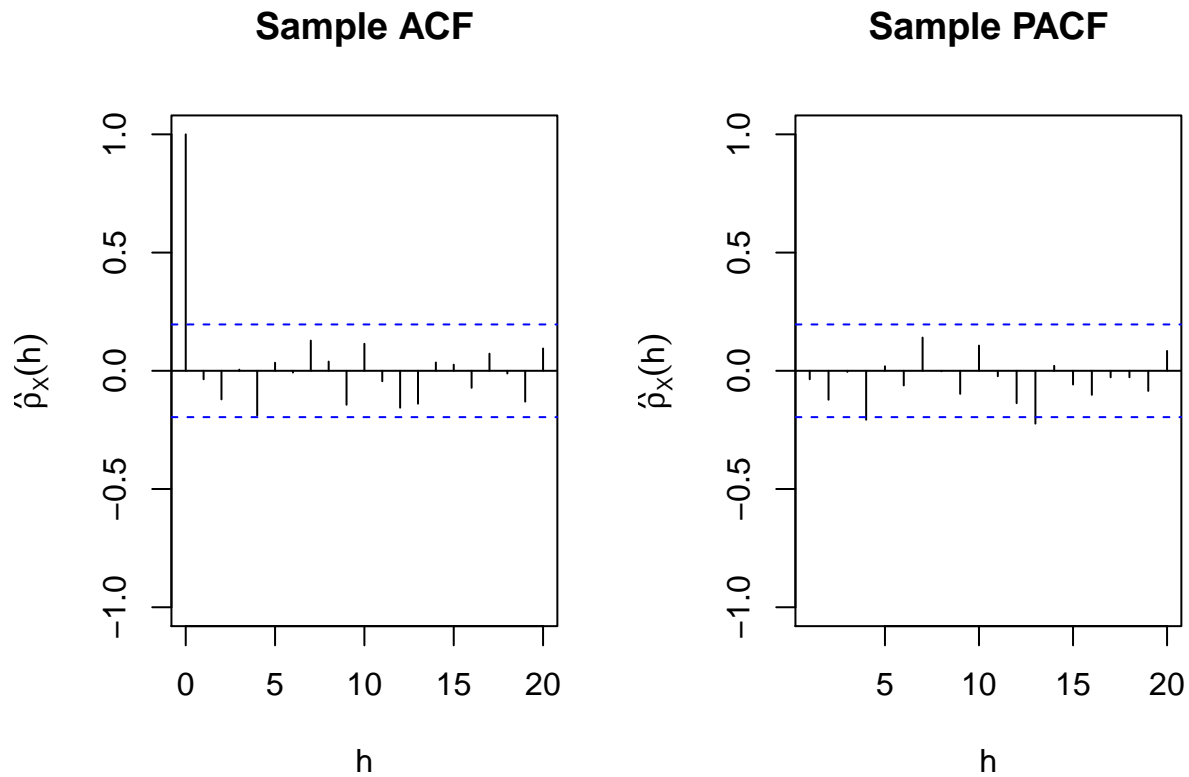
```
op=par(mfrow=c(1,2))
plot(q6.a.theo.acf,type="h",ylim=c(-1,1),
     main = "Theoretical ACF",
     ylab = expression(rho[X](h)),
     xlab = "h")
abline(h=0)
plot(q6.a.theo.pacf,type="h",ylim=c(-1,1),
     main = "Theoretical PACF",
     ylab = expression(rho[X](h)),
     xlab = "h")
abline(h=0)
```



```
par(op)
```

Q6.a Sample ACF and PACF

```
op=par(mfrow=c(1,2))
acf(q6.a,lag.max = 20,main="Sample ACF",ylim=c(-1,1),
    xlab="h",ylab=expression(hat(rho)[X](h)))
pacf(q6.a,lag.max = 20,main="Sample PACF",ylim=c(-1,1),
    xlab="h",ylab=expression(hat(rho)[X](h)))
```

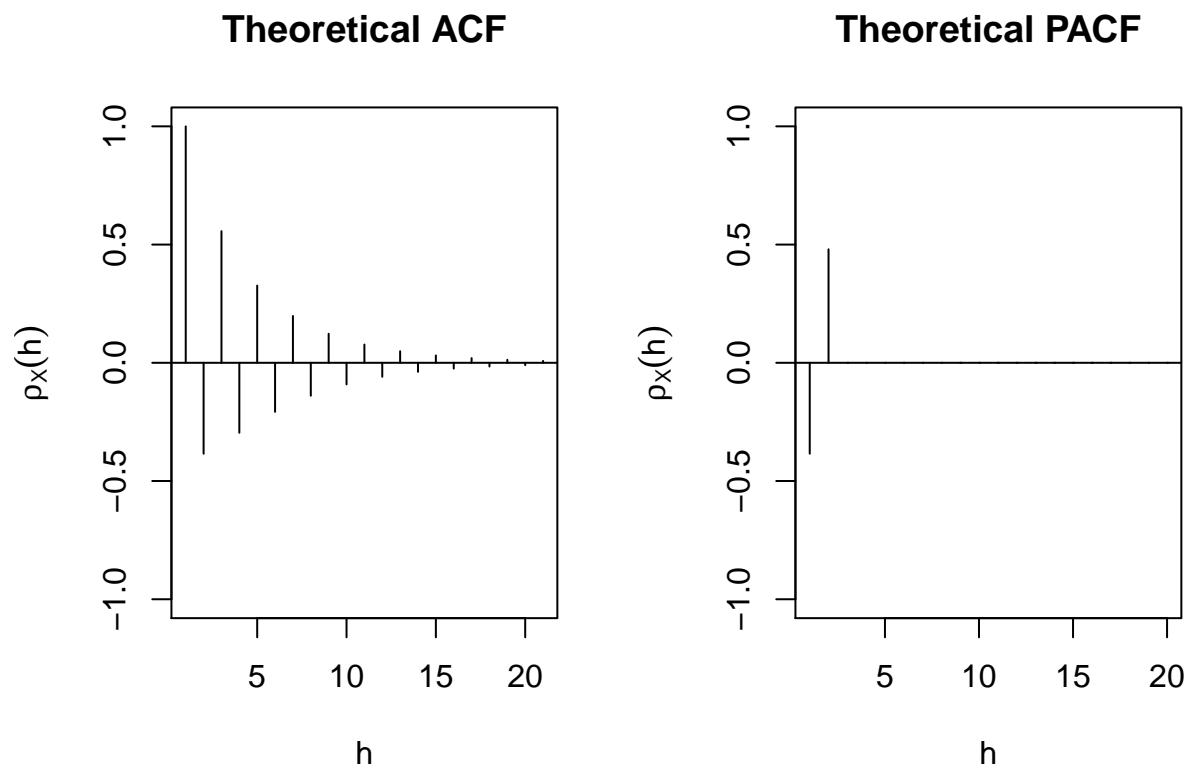


```
par(op)
```

For part A the sample and theoretical ACF and PACFs differ in that the sample ACF has much more covariance with larger values of h , and the PACF has some oscillation at larger values of h .

Q6.b Theoretical ACF and PACF

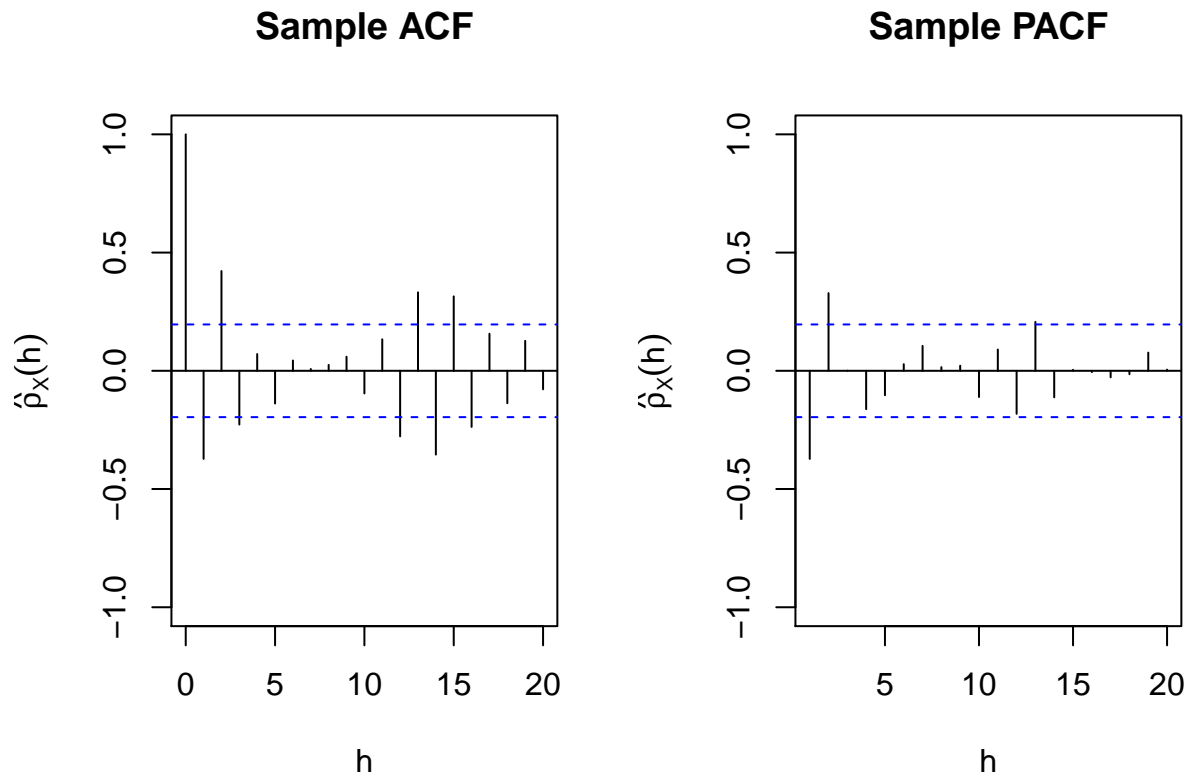
```
op=par(mfrow=c(1,2))
plot(q6.b.theo.acf,type="h",ylim=c(-1,1),
     main = "Theoretical ACF",
     ylab = expression(rho[X](h)),
     xlab = "h")
abline(h=0)
plot(q6.b.theo.pacf,type="h",ylim=c(-1,1),
     main = "Theoretical PACF",
     ylab = expression(rho[X](h)),
     xlab = "h")
abline(h=0)
```



```
par(op)
```

Q6.b Sample ACF and PACF

```
op=par(mfrow=c(1,2))
acf(q6.b,lag.max = 20,main="Sample ACF",ylim=c(-1,1),
    xlab="h",ylab=expression(hat(rho)[X](h)))
pacf(q6.b,lag.max = 20,main="Sample PACF",ylim=c(-1,1),
    xlab="h",ylab=expression(hat(rho)[X](h)))
```



```
par(op)
```

In part b, the sample ACF and PACF differ from the theoreticals by having larger covariances at larger values of h .

In both a and b, the sample ACFs oscillate quite frequently and sharply indicating little smoothness and little dependence between points.