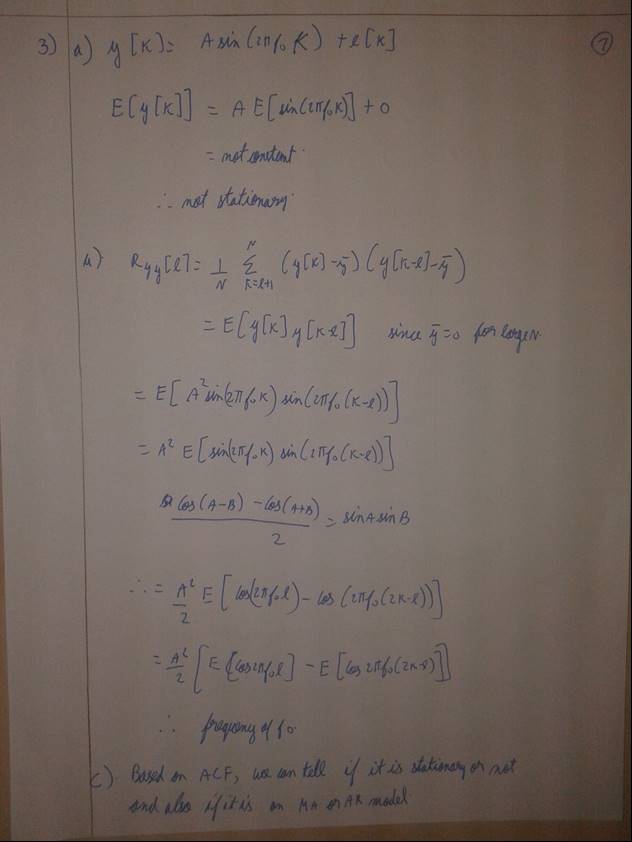


2) acf\_v <- ARMAacf(ar=c(0,0.4),lag.max=30)



3d) k=c(1:1000)

t=sin(2\*pi\*0.2\*k)

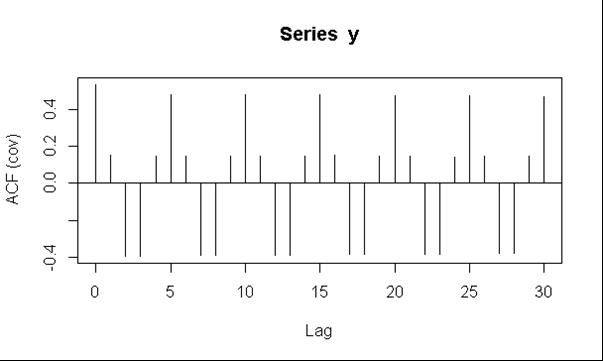
sigt=var(t)

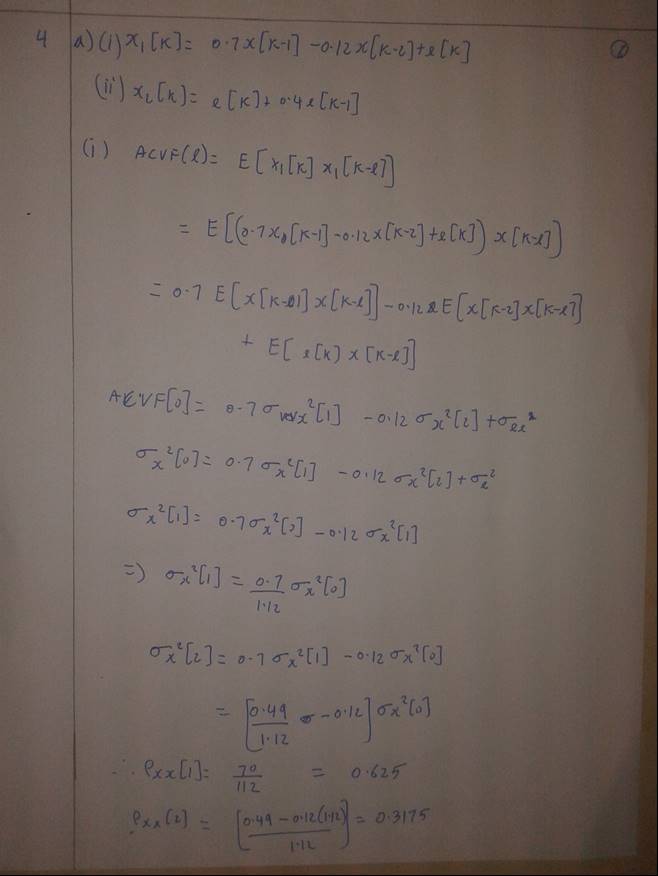
sige=sigt/10

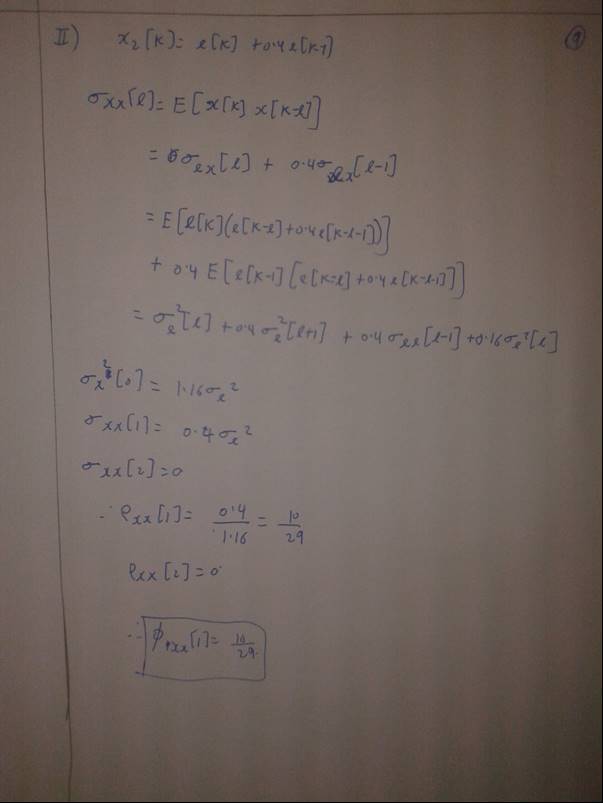
e=rnorm(1000,0,sqrt(sige))

y=sin(2\*pi\*0.2\*k)+e

acf(y,lag.max =NULL,type="covariance",plot=TRUE)

# in the plot we can see that the graph repeats at lags of 5 which implies the frequency is 0.2





4a)

acf\_x1 <- ARMAacf(ar=c(0.7,-0.12),lag.max=4,pacf= TRUE)

acf\_x2 <- ARMAacf(ma=c(0.4),lag.max=4,pacf = TRUE)

pacf\_x1\_1=acf\_x1[1]# pacf at lag 1 for x1

pacf\_x1\_2=acf\_x1[2]# pacf at lag 2 for x1

pacf\_x2\_1=acf\_x2[1]# pacf at lag 1 for x2

pacf\_x2\_2=acf\_x2[2]# pacf at lag 2 for x2

4b)

SMI=EuStockMarkets[,3]

mag=quakes[,4]

not=nottem

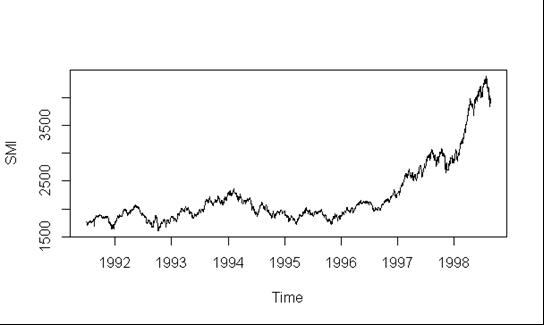
k=c(1:1000)

e=rnorm(1000,0,1)

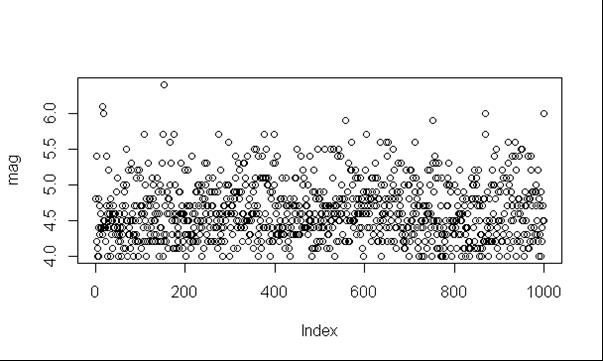
x=0.01\*k + e

#time series

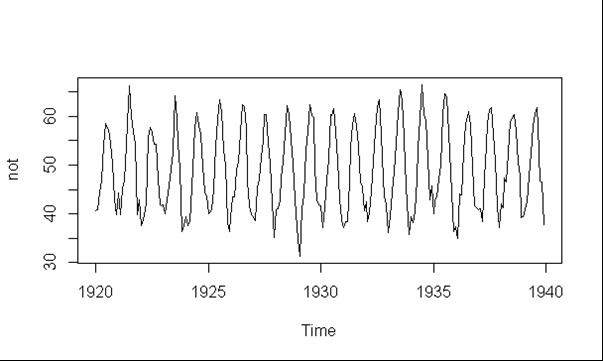
plot(SMI)

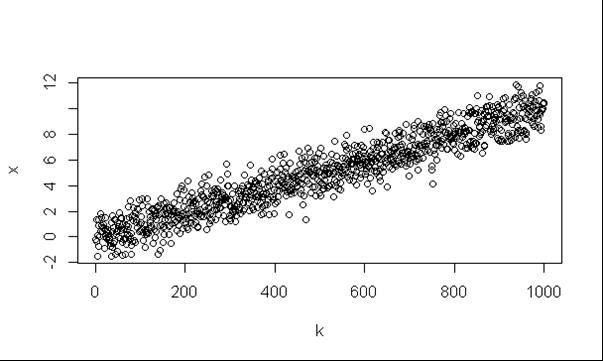


plot(mag)



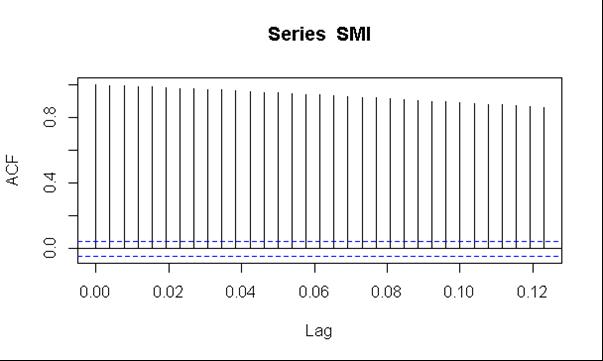
plot(not)



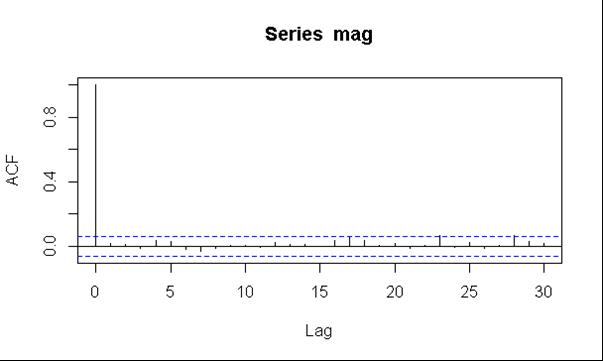
plot(k,x)

#ACF

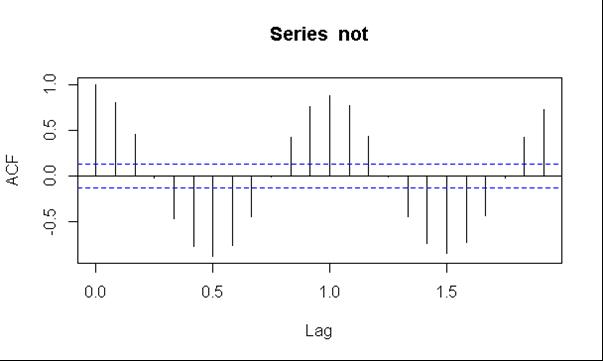
acf(SMI,lag.max =NULL,type="correlation",plot=TRUE)

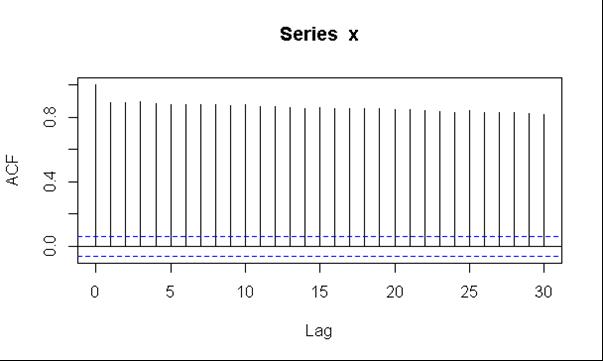


acf(mag,lag.max =NULL,type="correlation",plot=TRUE)

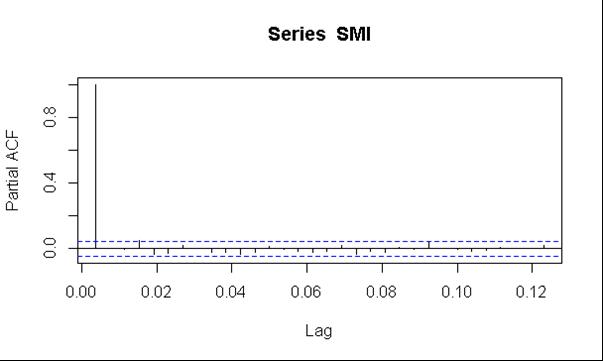


acf(not,lag.max =NULL,type="correlation",plot=TRUE)

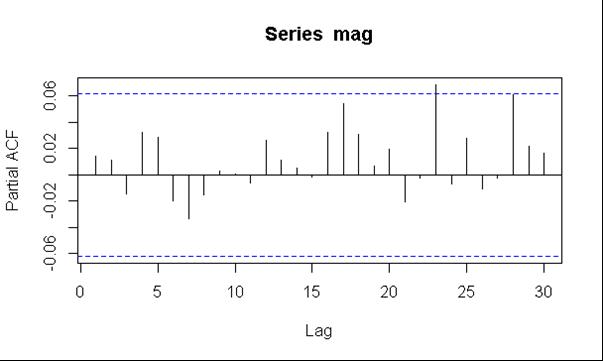


acf(x,lag.max =NULL,type="correlation",plot=TRUE)

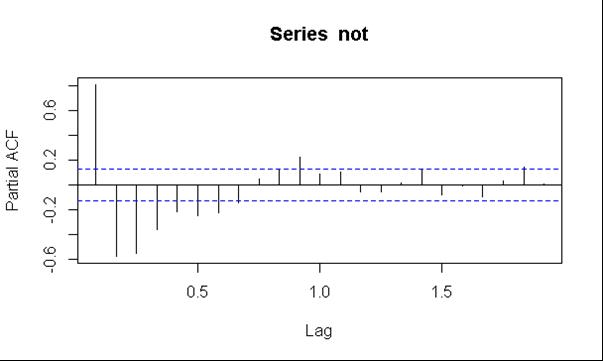
#PACF

pacf(SMI,lag.max =NULL,plot=TRUE)

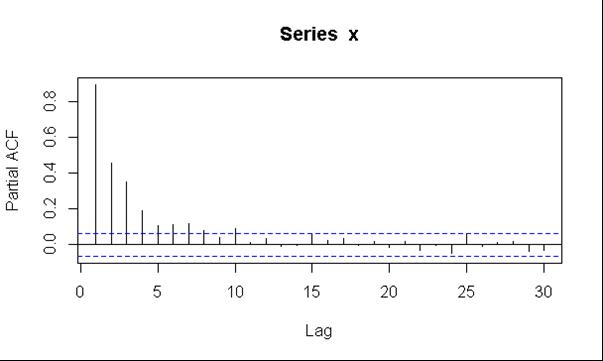
pacf(mag,lag.max =NULL,plot=TRUE)



pacf(not,lag.max =NULL,plot=TRUE)



pacf(x,lag.max =NULL,plot=TRUE)

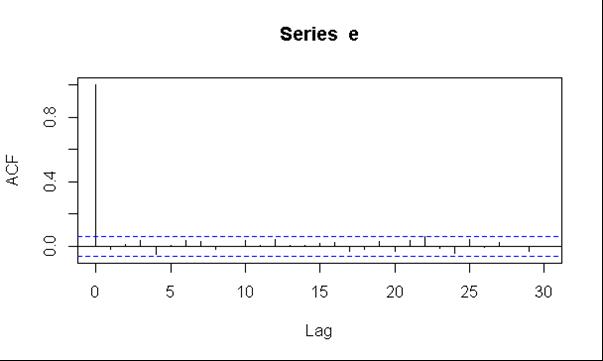


|  |  |  |
| --- | --- | --- |
|  | Stationary | Periodicity |
| SMI | Yes (AR model) | - |
| Quakes(mag) | Yes(MA model) | - |
| nottem | No | Yes(every 5 lags) |
| x | Yes(AR Model) | - |

5)

e=rnorm(1000,0,1)

t=acf(e,lag.max =NULL,type="correlation",plot=TRUE)



y=t$acf

z=acf(y,lag.max =20,type="correlation",plot=TRUE)

