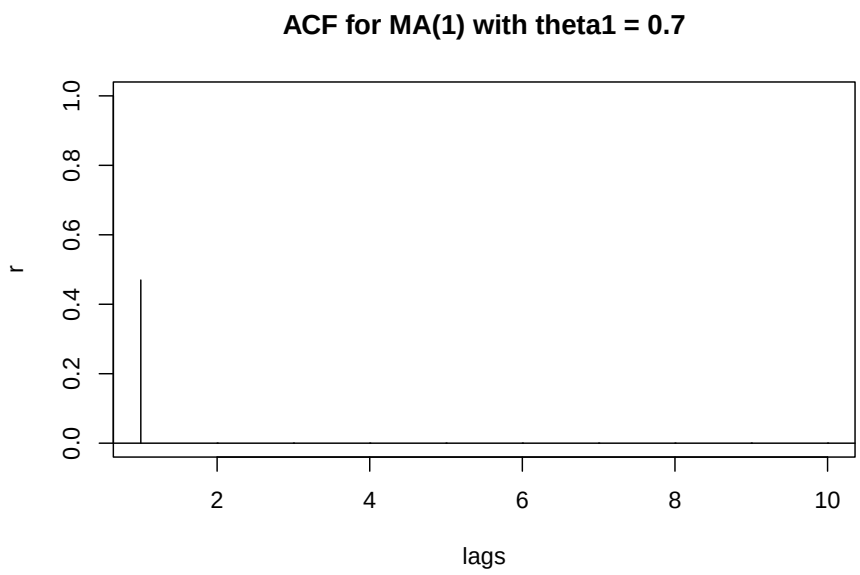
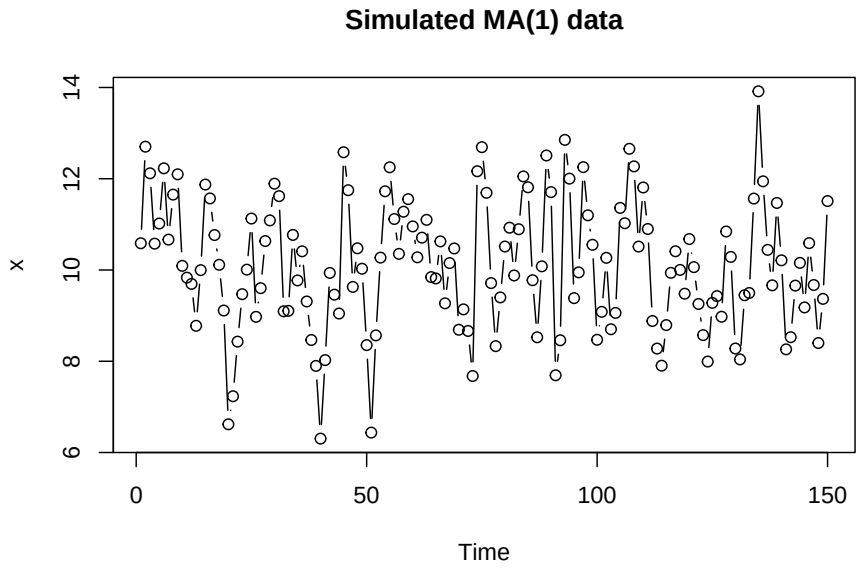
MA Models, Partial Autocorrelation, Notational Conventions

2023-05-06

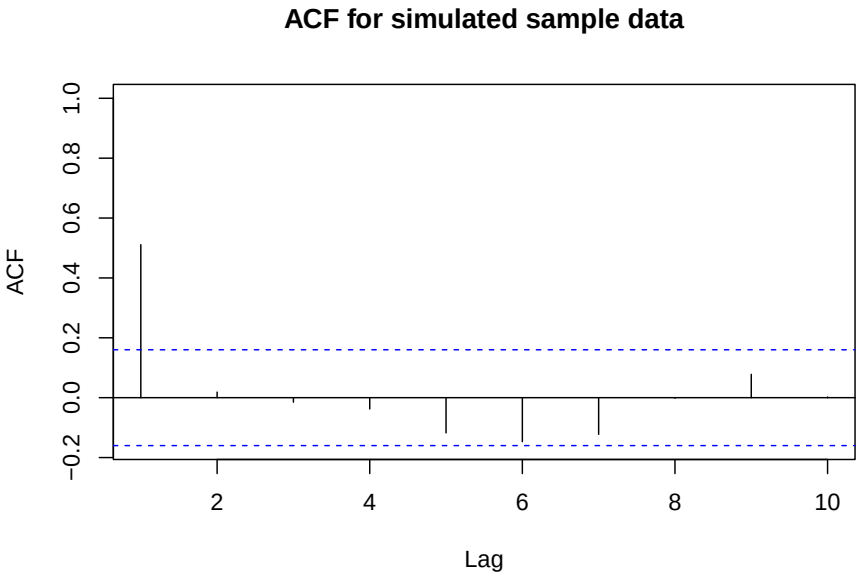
```
acfma1=ARMAacf(ma=c(0.7), lag.max=10) # 10 lags of ACF for MA(1) with theta1 = 0.7
lags=0:10 #creates a variable named lags that ranges from 0 to 10.
plot(lags,acfma1,xlim=c(1,10), ylab="r",type="h", main = "ACF for MA(1) with theta1 = 0
abline(h=0) #adds a horizontal axis to the plot
```




```
xc=arima.sim(n=150, list(ma=c(0.7))) #Simulates n = 150 values from MA(1)
x=xc+10 # adds 10 to make mean = 10. Simulation defaults to mean = 0.
plot(x,type="b", main="Simulated MA(1) data")
```



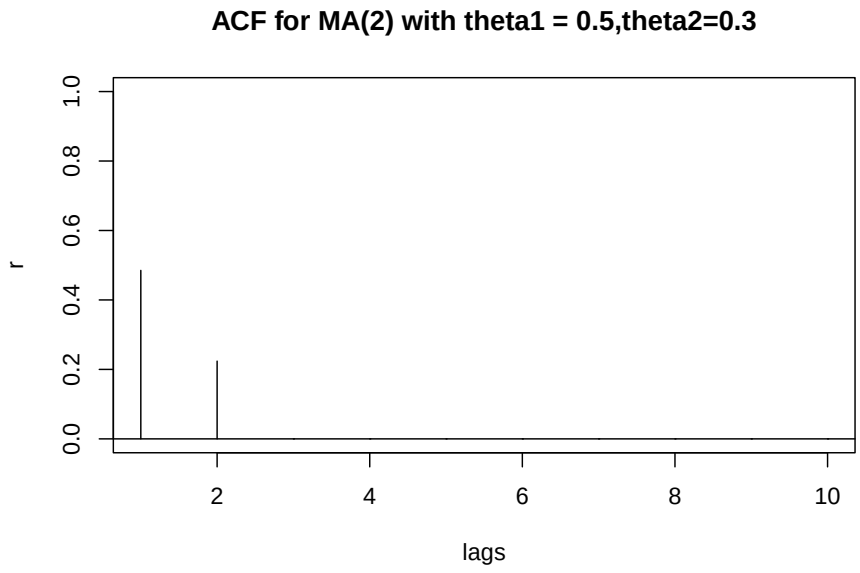

```
acf(x, xlim=c(1,10), main="ACF for simulated sample data")
```



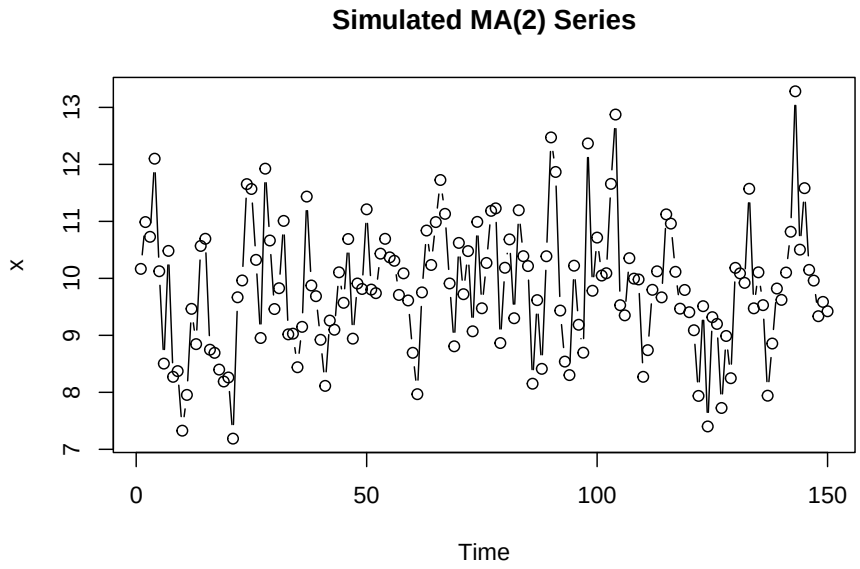
```r
acfma2=ARMAacf(ma=c(0.5,0.3), lag.max=10)
acfma2
```

```
##         0         1         2         3         4         5         6         7
## 1.0000000 0.4850746 0.2238806 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
##         8         9        10
## 0.0000000 0.0000000 0.0000000
```

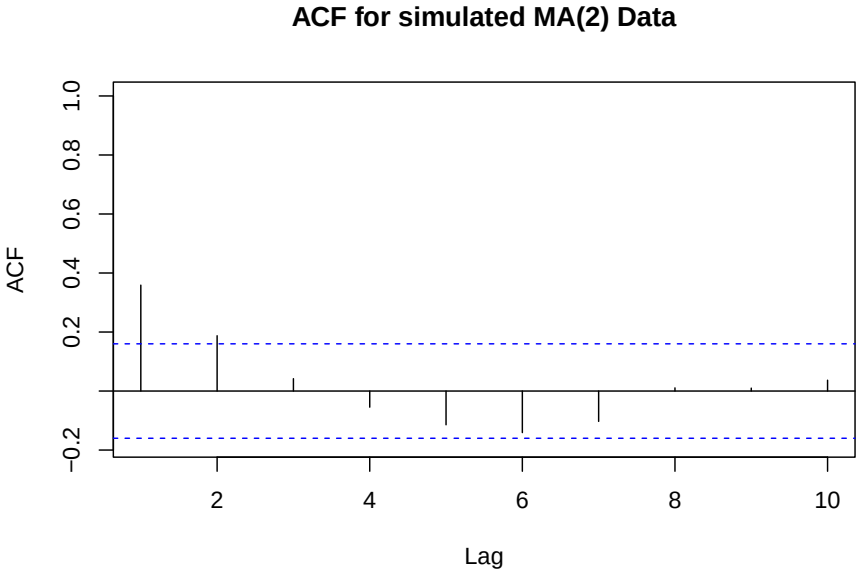
```r
lags=0:10
plot(lags,acfma2,xlim=c(1,10), ylab="r",type="h", main = "ACF for MA(2) with theta1 = 0
abline(h=0)
```




```r
xc=arima.sim(n=150, list(ma=c(0.5, 0.3)))
x=xc+10
plot(x, type="b", main = "Simulated MA(2) Series")
```




```r
acf(x, xlim=c(1,10), main="ACF for simulated MA(2) Data")
```



```
ma1pacf = ARMAacf(ma = c(.7),lag.max = 36, pacf=TRUE)
plot(ma1pacf,type="h", main = "Theoretical PACF of MA(1) with theta = 0.7")
```