Assignment 1

a)

The partial autocorrelation is the association between X_t and X_{t+k} with the linear dependence of X_{t+1} through $1X_{t+k-1}$ removed.Given by the formula :

pacf(X_t,X_{t+k})=Corr($X_t, X_{t+k}|X_{t+1} = x_{t+1,...},X_{t+k+1} = x_{t+k+1}$

The results we obtain are similar calucating the corellation with linear regression between $X_t \sim X_{t-1} + X_{t-2}$ and $X_{t-3} \sim X_{t-1} + X_{t-2}$

b)

As we can see the value of the $\varphi_2 = 0.1$doesn't fall between the confidence interval for ML estimate

c)

Do you have anything for this?

d)

As we can see comparing the plots using the ARIMA(0,0,1)x(0,0,1)$_{12}$we fitted and the results from the kernelab the ARIMA(0,0,1)x(0,0,1)$_{12}$ was able to produce better predictions compared to kernelab.

This result may be explained due to the fact that kernelab wasn't able to capture the seasonality or trend because the prediction is based on the width of the kernel and might some previous values not include in the kernel estimate.Also the gaussian kernel which is symmetric returns the most probable prediction (or mean prediction).

e)

How many outside the band?—> see the code that returns the result.

Assignment 2

chicken	diff(chicken)	so2	diff(so2)
slow decay differencing needed	Seasonal cycle pattern present	Fast decay but difference needed	Tails off after lag 0.02
Seasonal pattern present	Cut off after lag 1	Tails off quickly	Tails off after 0.18
EQcount	diff(EQcount)	HCT	diff(HCT)
Tails off after 7 lag	Tails off after 1 lag	Tails off after 18 lag	Slow decay tails off after 1 lag
The bars are in the borders	Tails off after 1 lag	Tails off after 7 lag	Tails off after 5 lag

• For the chicken data

For the nonseasonal part we can suggest an AR(2) from ACF-PACF and for the seasonal s=12 an MA(1)

The final model is a SARIMA(2,1,0)x(1,0,0)$_{12}$

- For the so2 data

It's very hard to distinguiss a model but maybe and ARMA(1,1,1) according to ACF-PACF plots of difference.

- For the EQcount

From AFC of EQcount difference is needed and according to ACF of difference and MA(1).
    The final model is ARIMA(0,1,1)

- For the HCT

According to ACF of HCT difference is needed.From PACF of difference we can suggest an AR(5) and form ACF an MA(1).
    The final model is ARIMA(5,1,1)