

Identificação de Modelos ARMA(p,q)

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Importando dados

```
load('data/class_data.RData')
```

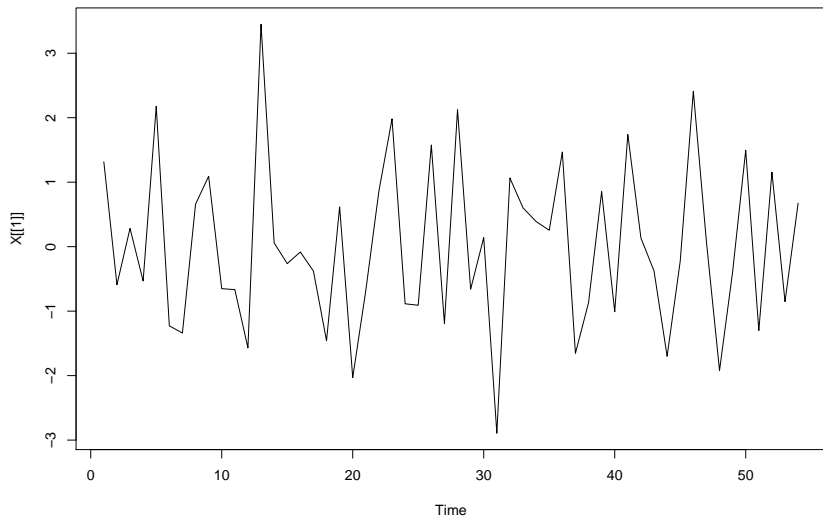
Metodologia

- ▶ Olhar para ACF e PACF segundo a tabela:

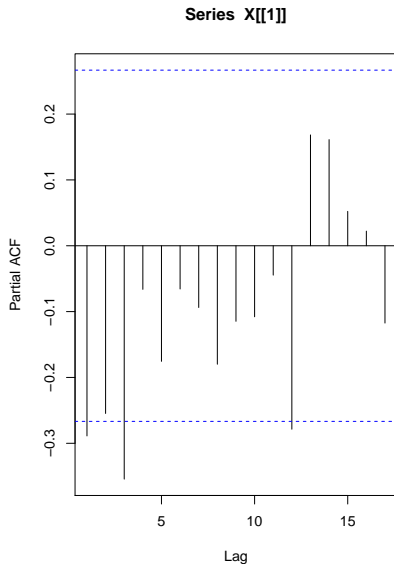
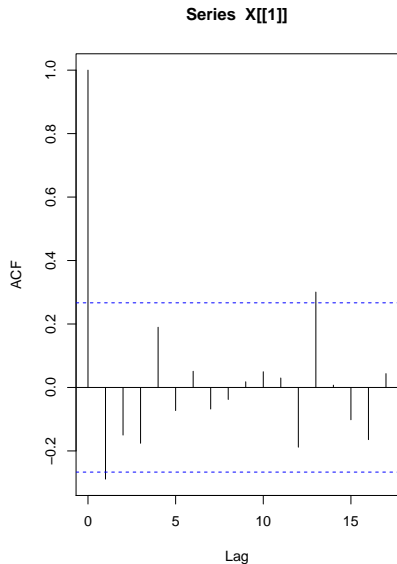
Modelo	ACF	PACF
AR(p)	Decai exp	Corte $> p$
MA(q)	Corte $> q$	Decai exp
ARMA(p, q)	Decai exp $> q - p$	Decai exp

- ▶ Olhar coeficientes dos modelos;
- ▶ Olhar ACF e PACF dos resíduos.

Série 1

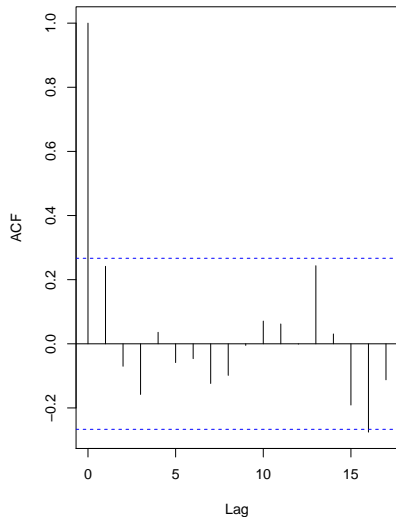


ACF e PACF

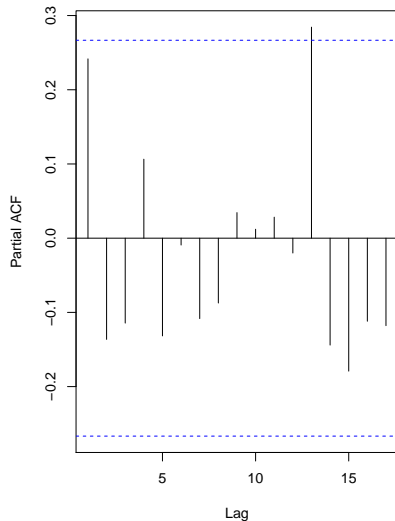


MA(1)

Series fit\$residuals



Series fit\$residuals



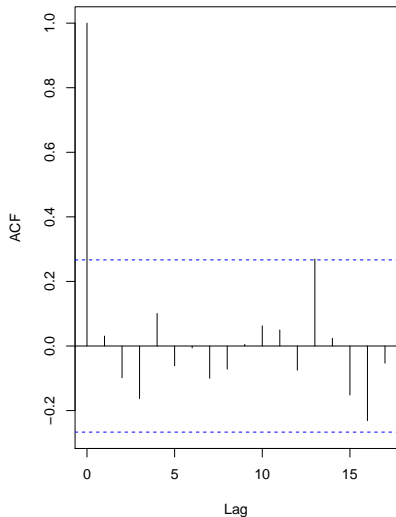
MA(1)

```
fit
```

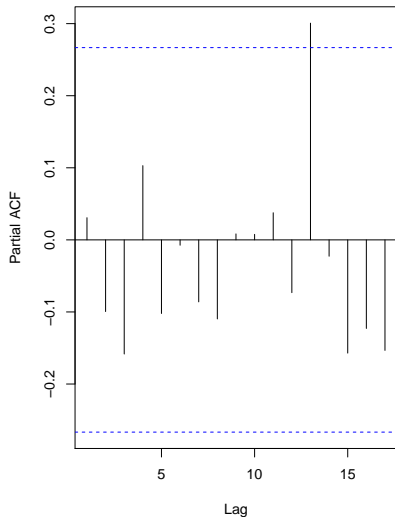
```
##  
## Call:  
## arima(x = X[[1]], order = c(0, 0, 1))  
##  
## Coefficients:  
##          ma1  intercept  
##        -1.0000   -0.0199  
## s.e.    0.0583    0.0089  
##  
## sigma^2 estimated as 1.086:  log likelihood = -80.84,  aic = 167.69
```

ARMA(1,1)

Series fit\$residuals



Series fit\$residuals



ARMA(1,1)

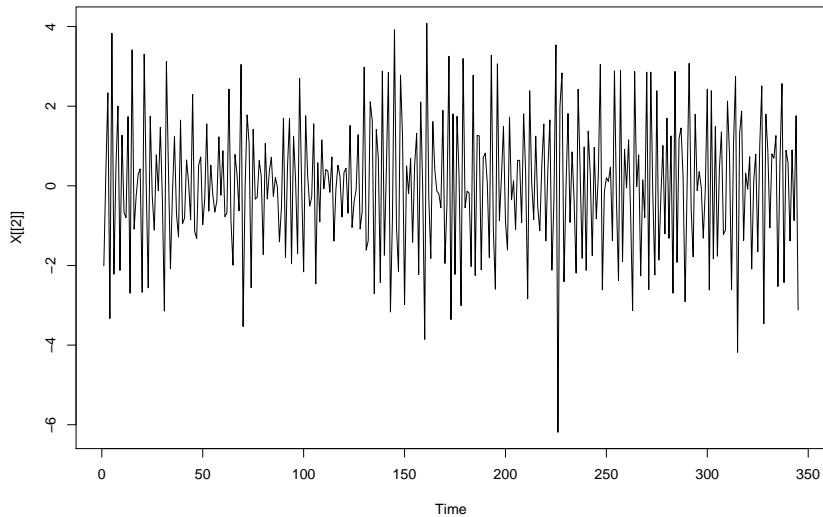
```
fit
```

```
##  
## Call:  
## arima(x = X[[1]], order = c(1, 0, 1))  
##  
## Coefficients:  
##          ar1          ma1  intercept  
##      0.2496   -1.0000    -0.0190  
## s.e.  0.1347    0.0515     0.0113  
##  
## sigma^2 estimated as 1.029:  log likelihood = -79.16,  aic = 166.32
```

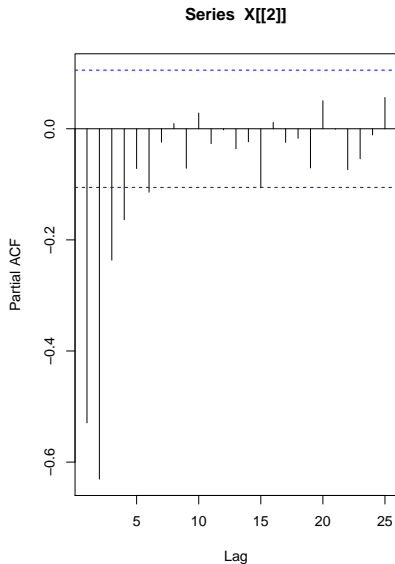
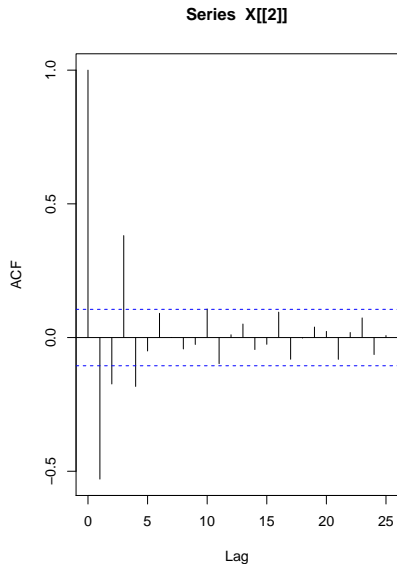
Modelo

- ▶ Podemos observar que ambos os gráficos tem decaimento exponencial.
- ▶ Pela ACF, $q - p = 0$.
- ▶ Notamos que $MA(1)$ também é um bom modelo.
- ▶ O coeficiente de AR é pequeno em relação ao do MA.
- ▶ Propomos $ARMA(1, 1)$

Série 2

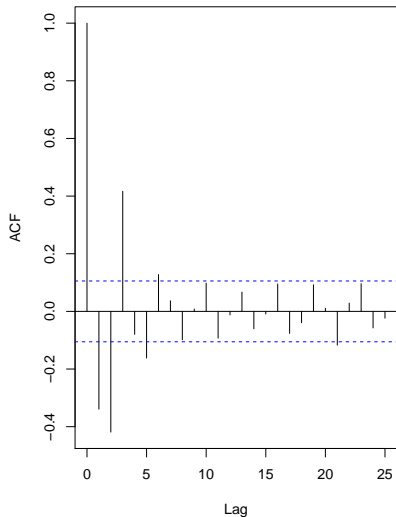


ACF e PACF

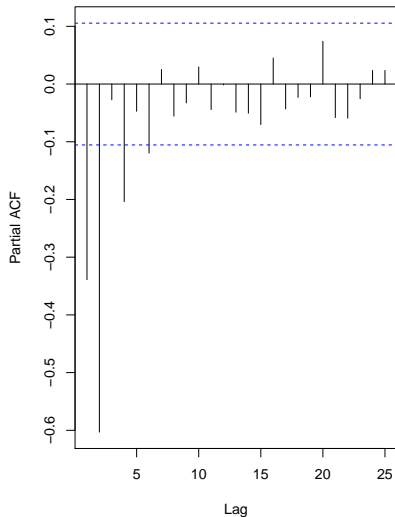


AR(1)

Series fit\$residuals



Series fit\$residuals



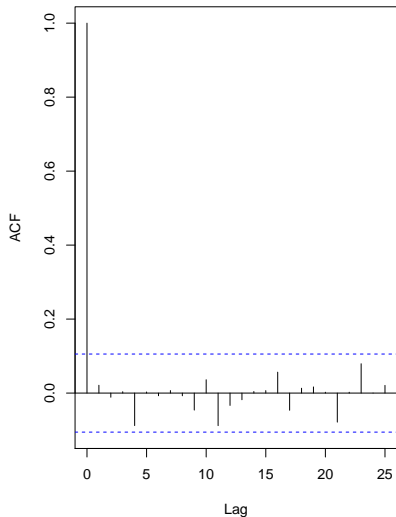
AR(1)

```
fit
```

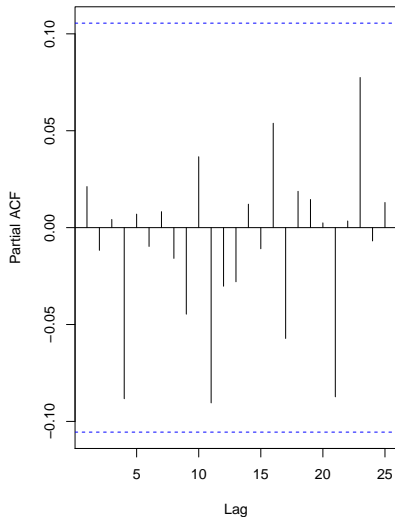
```
##  
## Call:  
## arima(x = X[[2]], order = c(1, 0, 0))  
##  
## Coefficients:  
##          ar1  intercept  
##      -0.5353    0.0206  
## s.e.   0.0458    0.0507  
##  
## sigma^2 estimated as 2.083:  log likelihood = -616.28,  aic = 1238.55
```

ARMA(2,1)

Series fit\$residuals



Series fit\$residuals



ARMA(2,1)

```
fit
```

```
##  
## Call:  
## arima(x = X[[2]], order = c(2, 0, 1))  
##  
## Coefficients:  
##          ar1          ar2          ma1  intercept  
##      -0.5639   -0.4626   -0.5818      0.0234  
## s.e.   0.0645    0.0588    0.0666      0.0117  
##  
## sigma^2 estimated as 1.092:  log likelihood = -505.7,  aic = 1021.4
```


Modelo

- ▶ Podemos observar que o primeiro gráfico tem decaimento exponencial
- ▶ Podemos observar que a PACF após o corte de lag 1
- ▶ Logo propomos $AR(1)$
- ▶ O modelo $ARMA(2, 1)$ poderia também ser uma boa opção.