Séries Temporais

Thiago Tavares Lopes Lucas de Bona Sartor

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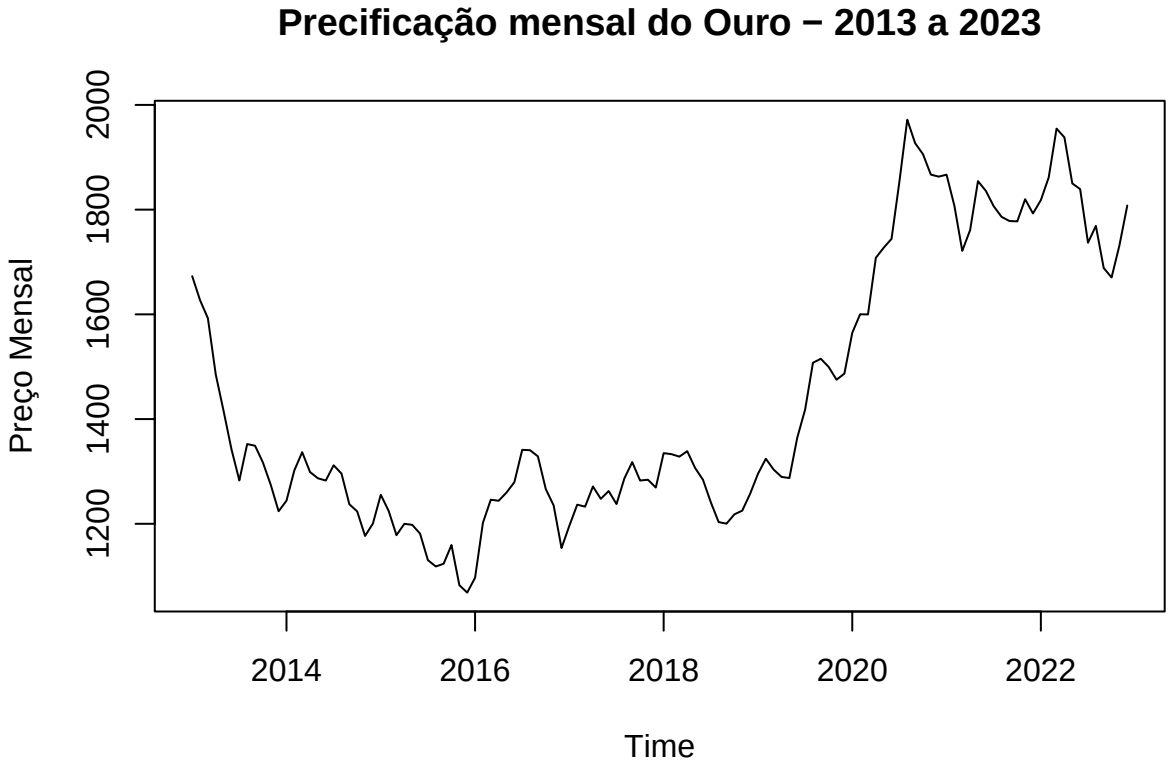
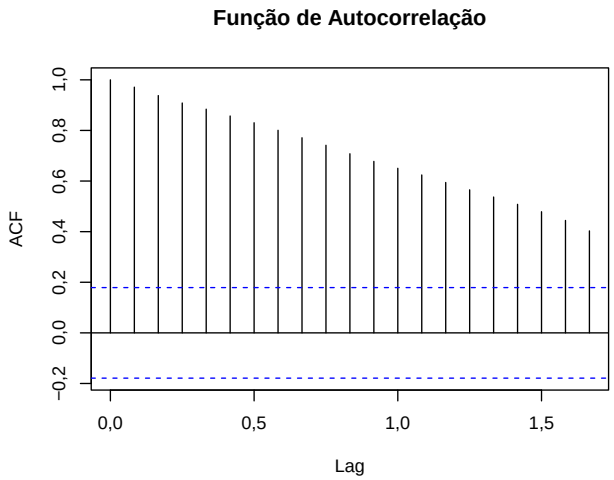
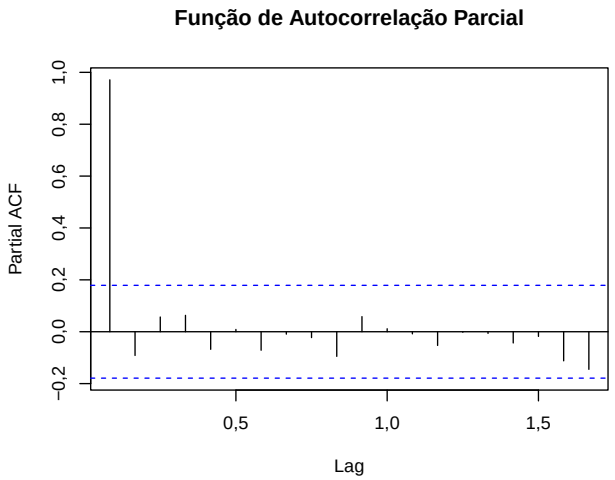
Sumário

1 Introdução

Nesta seção são apresentados os dados referentes a análise da série temporal de precificação mensal do ouro, entre os anos de 2013 e 2023. O banco de dados pode ser encontrado no link XXXXXXX.








```
# verificar - Sazonalidade, raiz unitaria e tendencia

tend_determ(data_serie)
```

```
## $CS
##
##  Cox Stuart test
##
## data:  ts
## statistic = 47, n = 60, p-value = 0,000012
## alternative hypothesis: non randomness
##
##
## $CeST
##
##  Cox and Stuart Trend test
##
## data:  ts
## z = 5,38, n = 120, p-value = 0,000000076
## alternative hypothesis: monotonic trend
##
##
## $MannKT
##
##  Mann-Kendall trend test
##
## data:  ts
## z = 7,32, n = 120, p-value = 0,00000000000024
## alternative hypothesis: true S is not equal to 0
## sample estimates:
##            S         varS          tau
##   3230,00000 194366,66667      0,45238
##
##
## $MannK
## tau = 0,452, 2-sided pvalue =<0,0000000000000002
##
## $KPSST
##
##  KPSS Test for Trend Stationarity
##
```

```
## data:  ts
## KPSS Trend = 0,444, Truncation lag parameter = 4, p-value = 0,01
##
##
## $Tabela
##                  Testes            H0 p_valor Conclusao
## 1           Cox Stuart NAO tendencia    0,00 Tendencia
## 2 Cox and Stuart Trend NAO tendencia    0,00 Tendencia
## 3   Mann-Kendall Trend NAO tendencia    0,00 Tendencia
## 4         Mann-Kendall NAO tendencia    0,00 Tendencia
## 5  KPSS Test for Trend NAO tendencia    0,01 Tendencia
```

```
raiz_unit(data_serie)
```

```
## $ADF
##
##  Augmented Dickey-Fuller Test
##
## data:  ts
## Dickey-Fuller = -2,53, Lag order = 4, p-value = 0,36
## alternative hypothesis: stationary
##
##
## $PP
##
##  Phillips-Perron Unit Root Test
##
## data:  ts
## Dickey-Fuller Z(alpha) = -10,2, Truncation lag parameter = 4, p-value =
## 0,53
## alternative hypothesis: stationary
##
##
## $KPSSL
##
##  KPSS Test for Level Stationarity
##
## data:  ts
## KPSS Level = 1,65, Truncation lag parameter = 4, p-value = 0,01
##
##
## $Tabela
##                       Testes            H0 p_valor Conclusao
## 1   Augmented Dickey-Fuller     Tendencia  0,3553 Tendencia
## 2 Phillips-Perron Unit Root     Tendencia  0,5252 Tendencia
## 3       KPSS Test for Level NAO tendencia  0,0100 Tendencia
```

```
sazonalidade(data_serie)
```

```
## $KrusW
## Test used:  Kruskall Wallis
##
## Test statistic:  1,78
## P-value:  0,99913
##
## $Fried
## Test used:  Friedman rank
##
```

```
## Test statistic:  6,26
## P-value:  0,85536
##
## $Tabela
##            Testes          H0 p_valor   Conclusao
## 1 Kruskall Wallis NAO Sazonal  0,9991 NAO Sazonal
## 2   Friedman rank NAO Sazonal  0,8554 NAO Sazonal
```

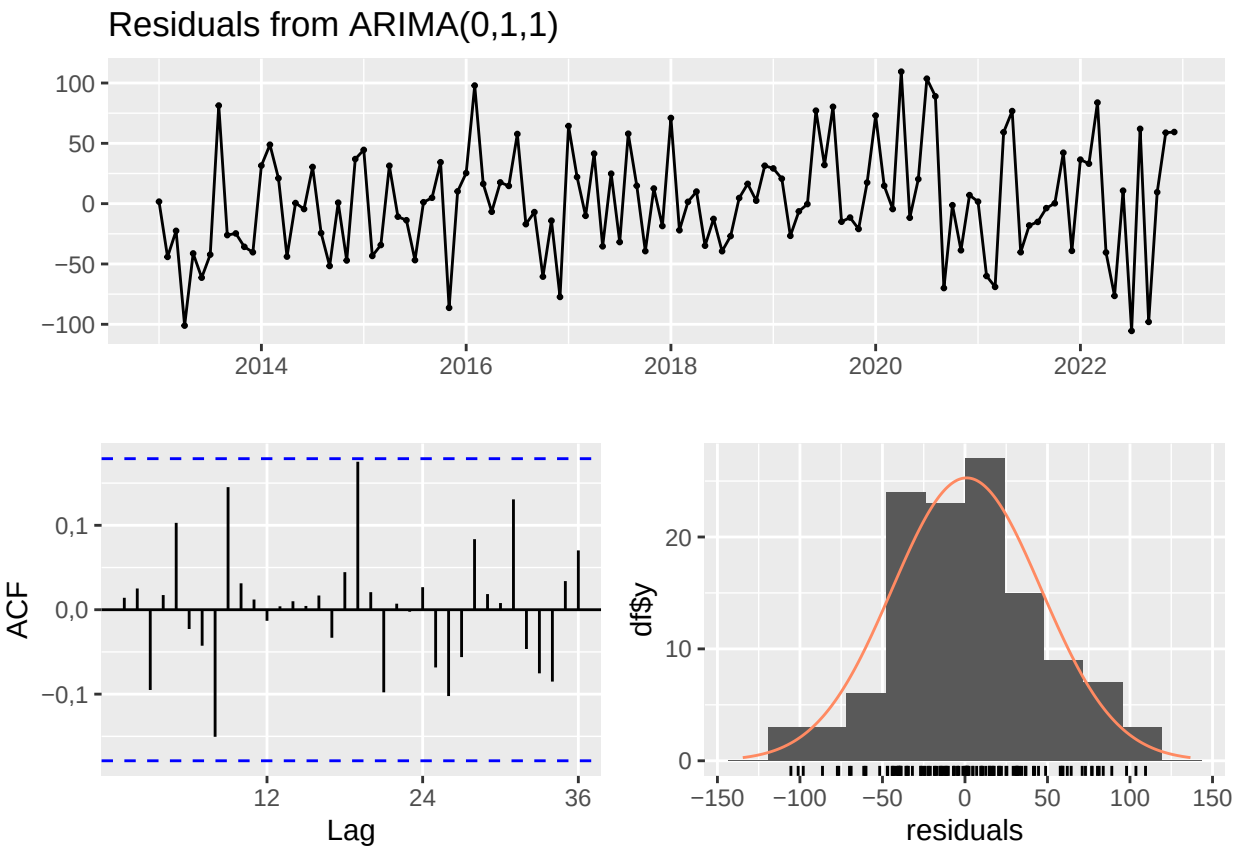
```
# resultado -
```

```
arima_model<-auto.arima(data_serie)

summary(arima_model)
```

```
## Series: data_serie
## ARIMA(0,1,1)
##
## Coefficients:
##         ma1
##       0,282
## s.e.  0,083
##
## sigma^2 = 2062:  log likelihood = -622,48
## AIC=1249   AICc=1249,1   BIC=1254,5
##
## Training set error measures:
##                     ME    RMSE    MAE      MPE   MAPE    MASE     ACF1
## Training set 1,0079 45,034 35,547 0,023366 2,4696 0,26147 0,014123
```

```
checkresiduals(arima_model)
```




```
##
```

```
##  Ljung-Box test
##
## data:  Residuals from ARIMA(0,1,1)
## Q* = 15,4, df = 23, p-value = 0,88
##
## Model df: 1.   Total lags used: 24
```

```
ggqqplot(arima_model$residuals)+ggtitle("Res?duos Modelo SES")
```

```
## Don't know how to automatically pick scale for object of type <ts>. Defaulting
## to continuous.
## Don't know how to automatically pick scale for object of type <ts>. Defaulting
## to continuous.
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## to continuous.
```