Análise dos Resíduos de Modelos Autoregressivos

★ Um *bom* modelo é aquele que os seus resíduos se assemelham ao ruído branco! Ou seja, os resíduos devem possuir:

- ☑ Média zero;
- ☑ Variância constante;
- ☑ Autocorrelação desprezível.

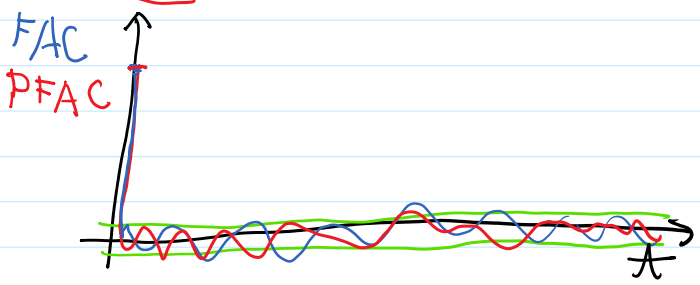
Fonte: www.pixabay.com

Se essas propriedades não estão presentes, o modelo não é adequado.

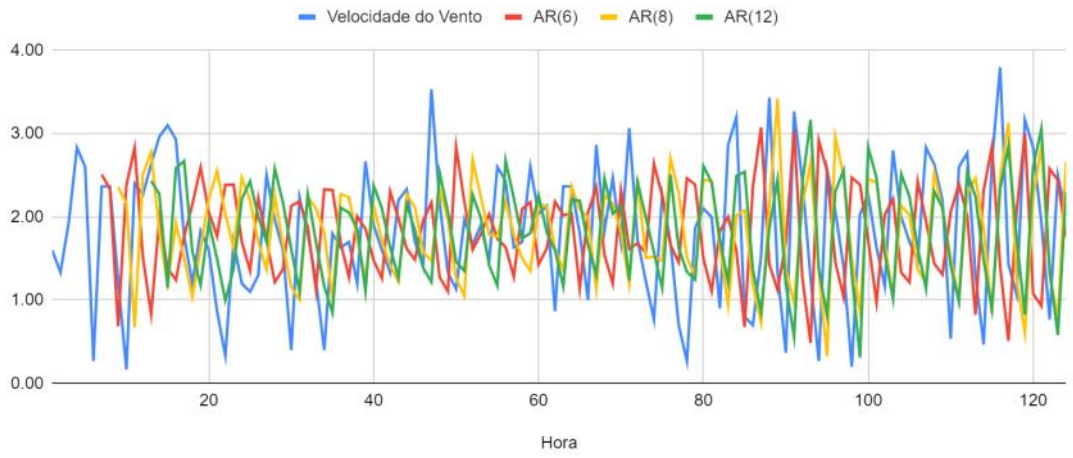
E agora, como analisar os resíduos?

1) Calcular os Resíduos: $Y_{observado,t} - Y_{estimado,t} = E_t$

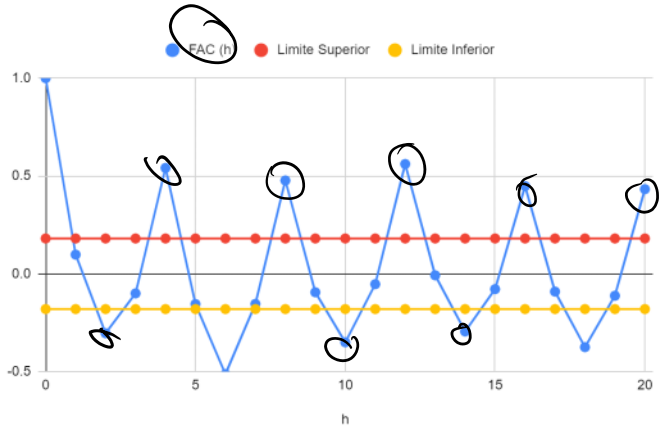
2) Calcular a Função de Autocorrelação (FAC) e a Função de Autocorrelação Parcial (PFAC) dos resíduos:

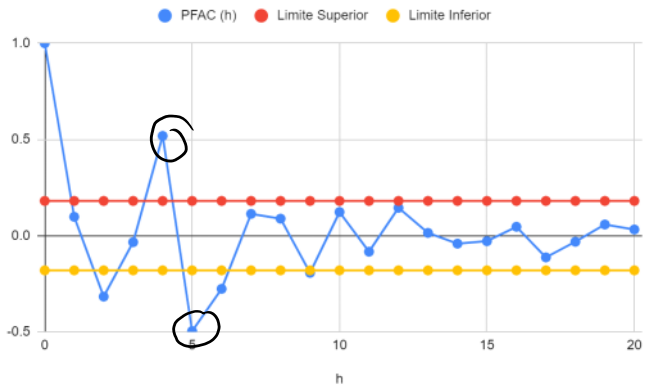


Exemplo 1: AR(6), AR(8) e AR(12) da Velocidade média do vento (m/s)

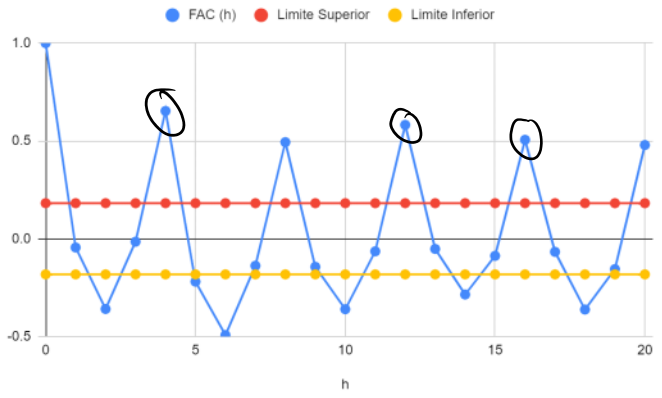

Velocidade do Vento
AR(6)
AR(8)
AR(12)
4.00
3.00
2.00
1.00
0.00
20
40
60
80
100
120
Hora

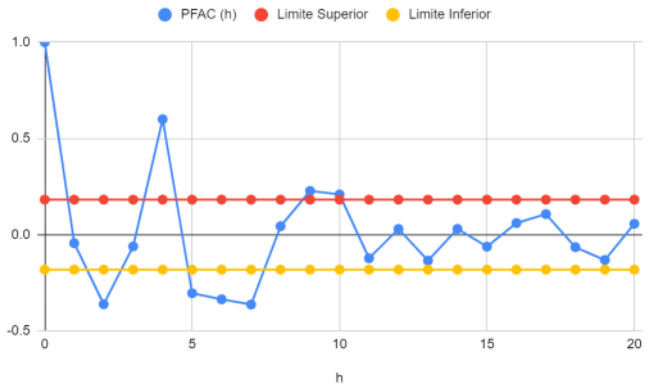
AR(6)


FAC (h)
Limite Superior
Limite Inferior
1.0
0.5
0.0
-0.5
0
5
10
15
20
h

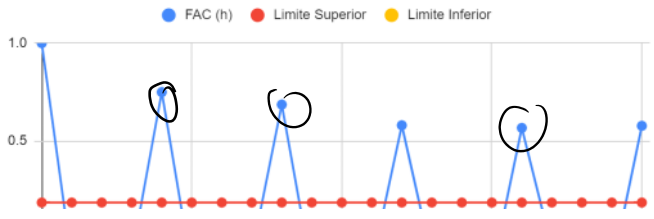

PFAC (h)
Limite Superior
Limite Inferior
1.0
0.5
0.0
-0.5
0
10
15
20
h

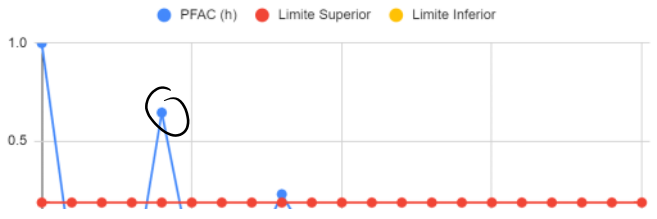
AR(8)

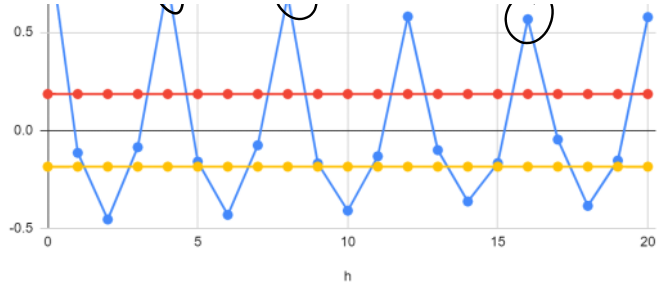

FAC (h)
Limite Superior
Limite Inferior
1.0
0.5
0.0
-0.5
0
5
10
15
20
h

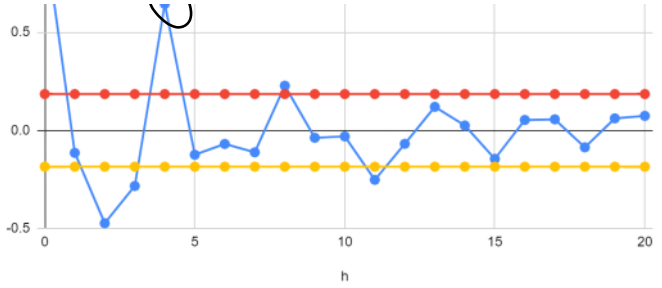

PFAC (h)
Limite Superior
Limite Inferior
1.0
0.5
0.0
-0.5
0
5
10
15
20
h

AR(12)

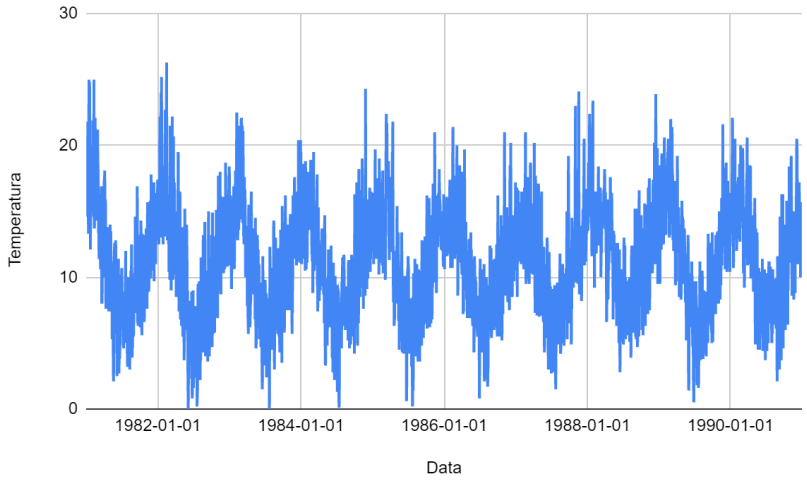

FAC (h)
Limite Superior
Limite Inferior
1.0
0.5


PFAC (h)
Limite Superior
Limite Inferior
1.0
0.5

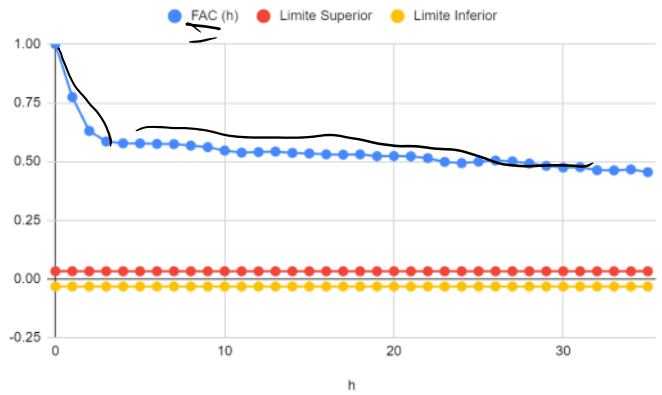


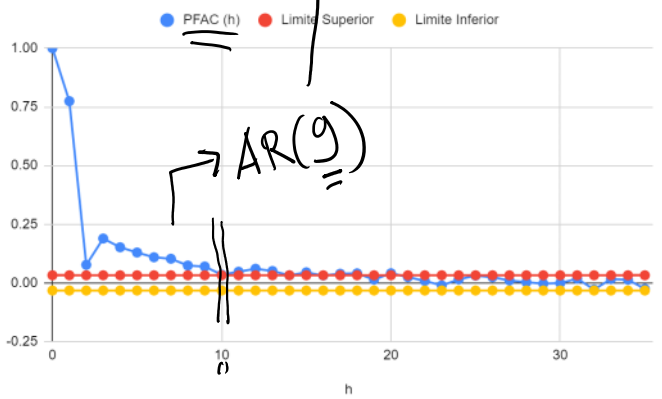


Exemplo 2: Temperatura mínima diária de Melbourne, Austrália
Fonte: https://machinelearningmastery.com/autoregression-models-time-series-forecasting-python/

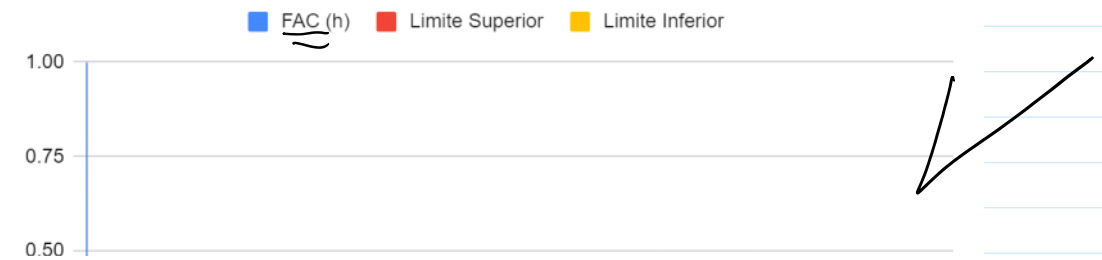


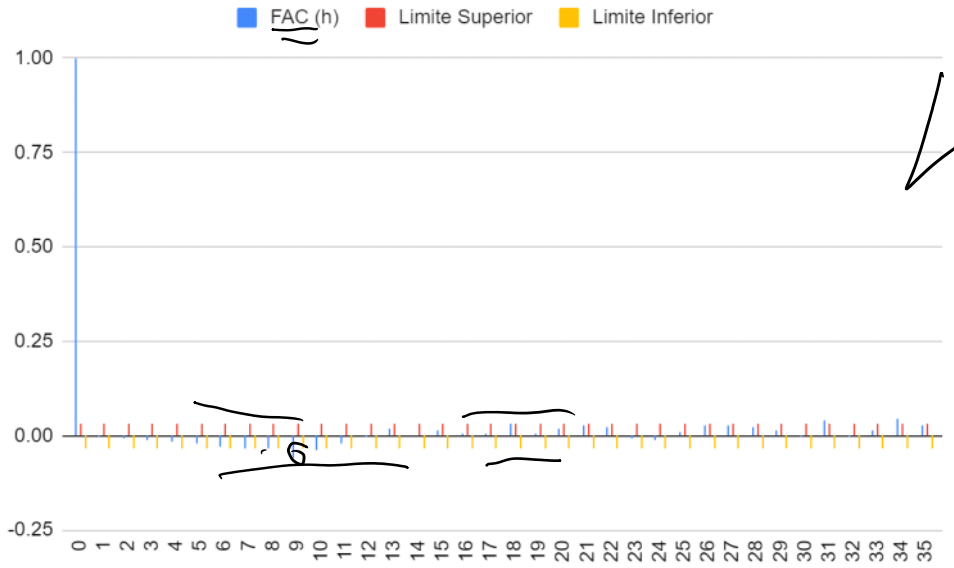
C.D. ≈ 0,64

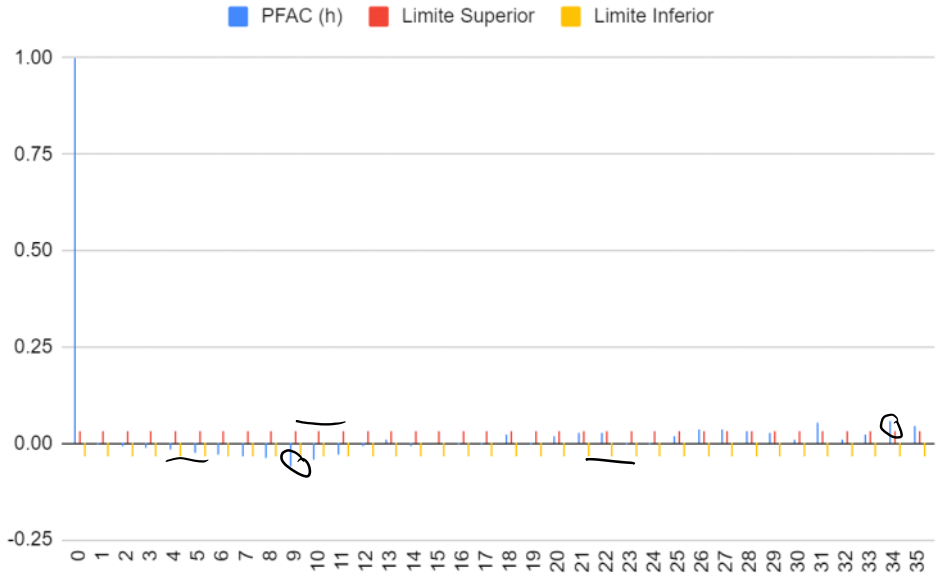




Resultados:







★ Atenção: Sempre verifique se os resíduos seguem uma distribuição normal, pois caso o contrário, pode haver espaço para aperfeiçoamento, como a aplicação de transformação de dados.

Fonte: www.pixabay.com