
Guide to ACF/PACF Plots

The plots shown here are those of pure or theoretical ARIMA processes. Here are some general guidelines for identifying the process:

- Nonstationary series have an ACF that remains significant for half a dozen or more lags, rather than quickly declining to zero. You must difference such a series until it is stationary before you can identify the process.
- Autoregressive processes have an exponentially declining ACF and spikes in the first one or more lags of the PACF. The number of spikes indicates the order of the autoregression.
- Moving average processes have spikes in the first one or more lags of the ACF and an exponentially declining PACF. The number of spikes indicates the order of the moving average.
- Mixed (ARMA) processes typically show exponential declines in both the ACF and the PACF.

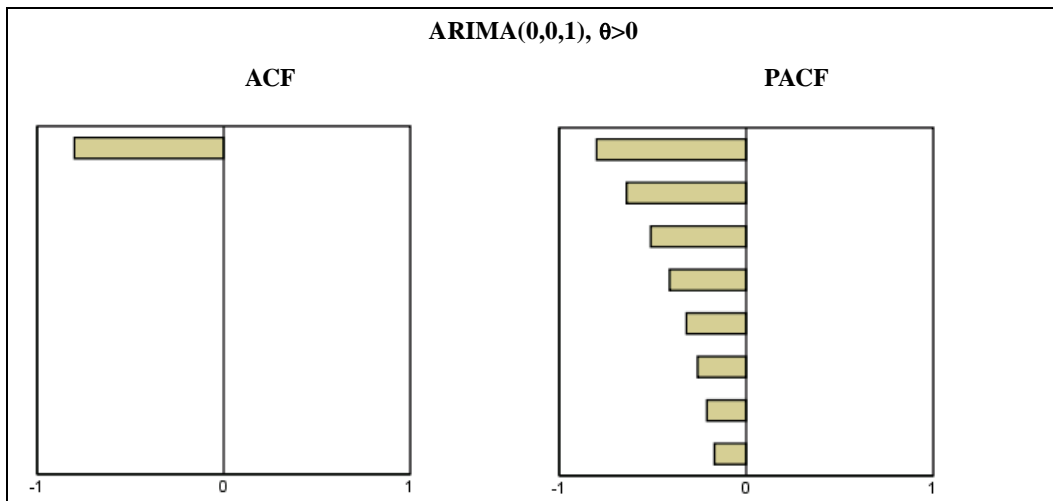
At the identification stage, you do not need to worry about the sign of the ACF or PACF, or about the speed with which an exponentially declining ACF or PACF approaches zero. These depend upon the sign and actual value of the AR and MA coefficients. In some instances, an exponentially declining ACF alternates between positive and negative values.

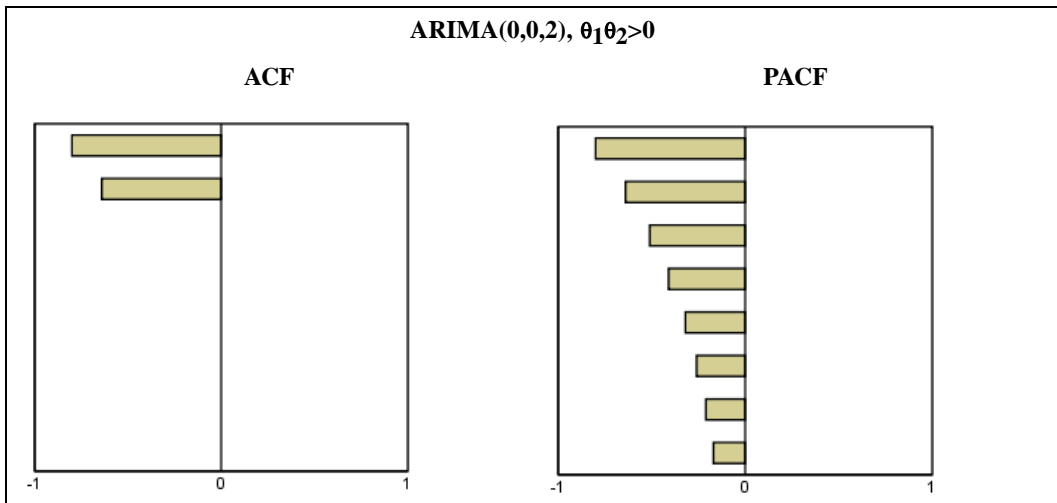
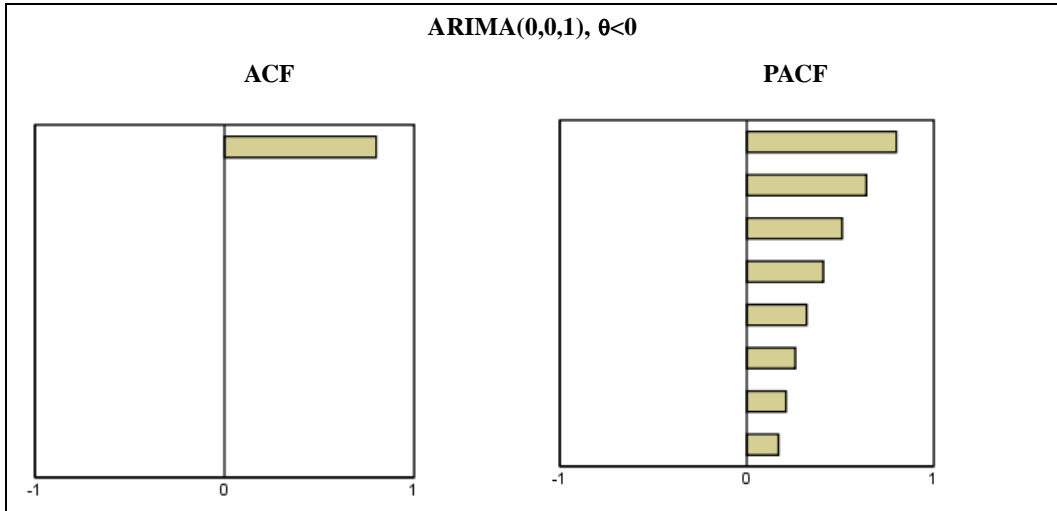
ACF and PACF plots from real data are never as clean as the plots shown here. You must learn to pick out what is essential in any given plot. Always check the ACF and PACF of the residuals, in case your identification is wrong. Bear in mind that:

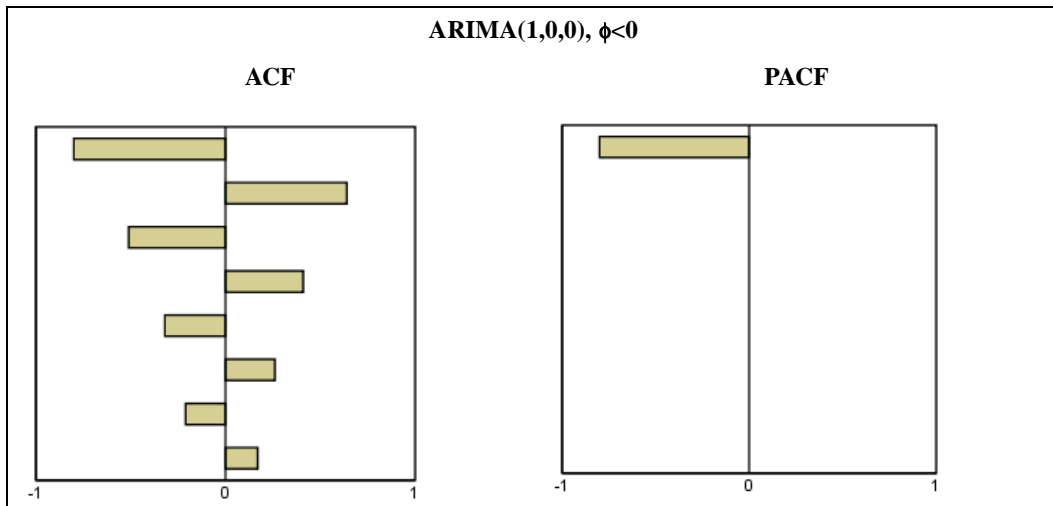
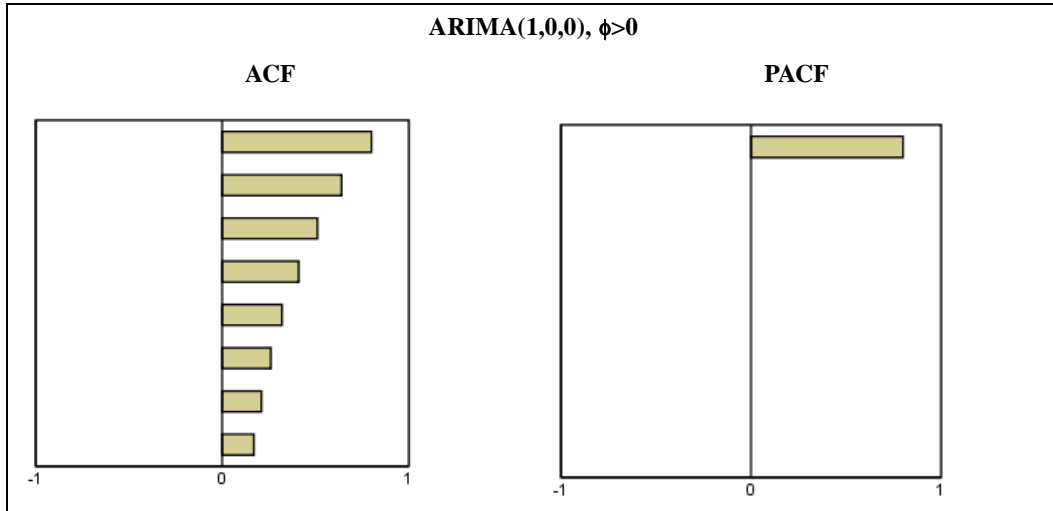
- Seasonal processes show these patterns at the seasonal lags (the multiples of the seasonal period).

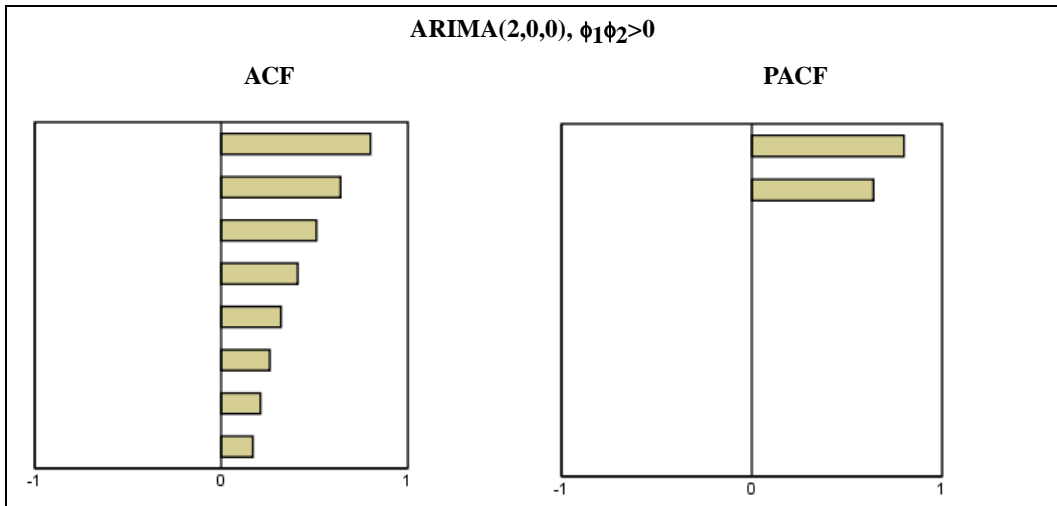
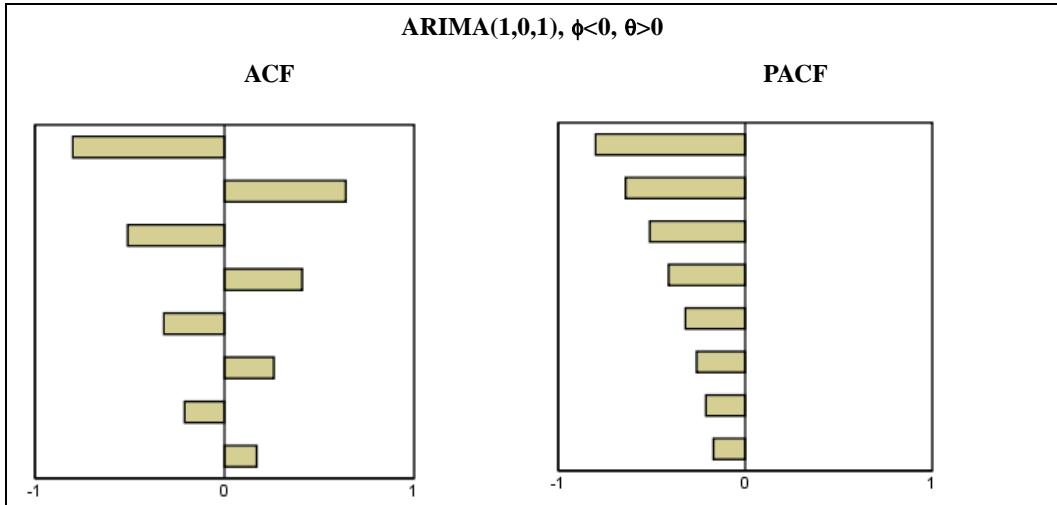
- You are entitled to treat nonsignificant values as zero. That is, you can ignore values that lie within the confidence intervals on the plots. You do not have to ignore them, however, particularly if they continue the pattern of the statistically significant values.
- An occasional autocorrelation will be statistically significant by chance alone. You can ignore a statistically significant autocorrelation if it is isolated, preferably at a high lag, and if it does not occur at a seasonal lag.

Consult any text on ARIMA analysis for a more complete discussion of ACF and PACF plots.









ARIMA(0,1,0) (integrated series)

ACF

