

3.7: Summary

The class of autoregressive moving average processes has been introduced to model stationary stochastic processes. Theoretical properties such as causality and invertibility have been examined, which depend on the zeroes of the autoregressive and moving average polynomials, respectively.

It has been shown how the causal representation of an ARMA process can be utilized to compute its covariance function which contains all information about the dependence structure. Assuming known parameter values, several forecasting procedures have been discussed. The Durbin- Levinson algorithm works well for pure AR processes, while the innovations algorithm is particularly useful for pure MA processes. Predictions using an infinite past work well for causal and invertible ARMA processes. For practical purposes, however, a truncated version is more relevant.

Since the exact parameter values are in general unknown, several estimation procedures were introduced. The Yule-Walker procedure is only optimal in the AR case but provides useful initial estimates that can be used for the numerical derivation of maximum likelihood or least squares estimates.

Finally, a framework has been provided that may potentially be useful when facing the problem of analyzing a data set in practice.

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