

OUTLIER DETECTION IN TIMESERIES

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INTRODUCTION

THEORETICAL RESULTS

Types of outlier in ARIMA model

We say that x_t follows an ARIMA (p,d,q) model if x_t has the form

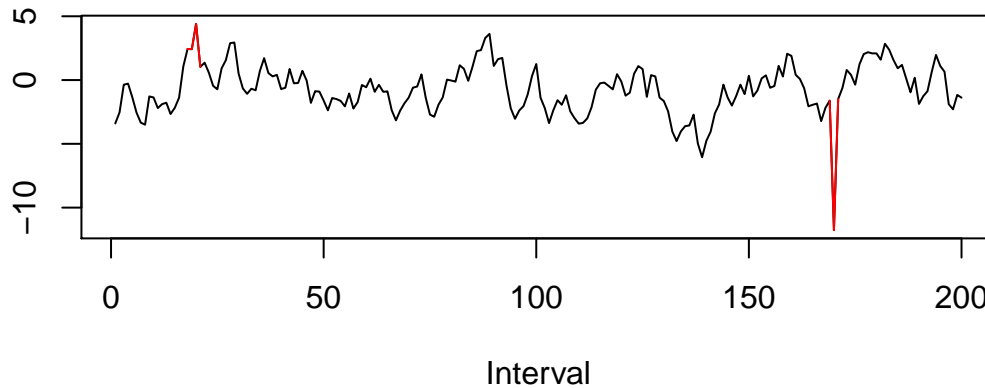
$$\phi(B)(1 - B)^d X_t = \theta(B)Z_t \quad (1)$$

Where B is backshift operator, Z_t is white noise process, $\phi(B) = 1 - \alpha_1 B - \alpha_2 B^2 \dots - \alpha_p B^p$, $\theta(B) = 1 + \beta_1 B + \beta_2 B^2 + \dots + \beta_q B^q$, and d is the number of differenced times. It is further assumed the root of $\phi(B)$ and $\theta(B)$ are assumed to be outside unit circle and have no common roots.

Additive outliers (AO)

An additive outlier (AO) correspond to an exogenous change of a single observation of the time series. It is associated with incident like measurement errors or impulse effect due to external effect. A time series $y_1 \dots y_T$ affected by AO at $t=k$ is given by

$$y_t = x_t + \omega I_t^k \quad (2)$$



Innovative Outliers

Temporal Change outliers

Level Shifts Outliers

OUTLIER DETECTION AND ESTIMATION PROCEDURE

EXPERIMENTS

CONCLUSION

REFERENCE

APPENDIX