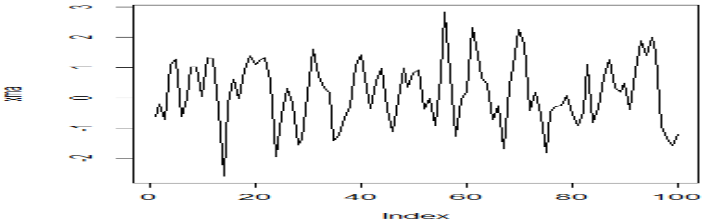
ARIMA

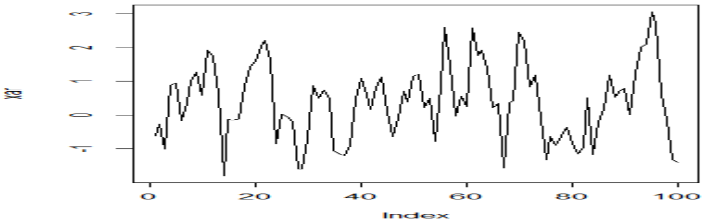
School of Information Studies
Syracuse University

# Dynamics of a Time Series

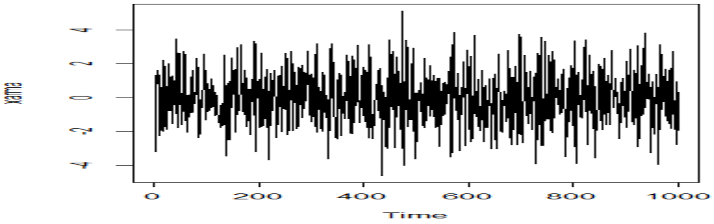
- Moving Average




- Autoregressive




- ARMA



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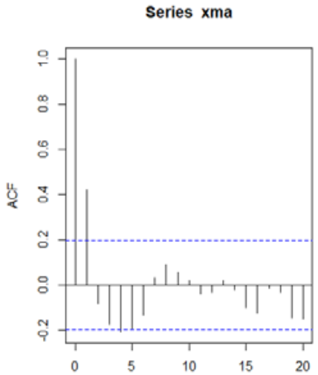
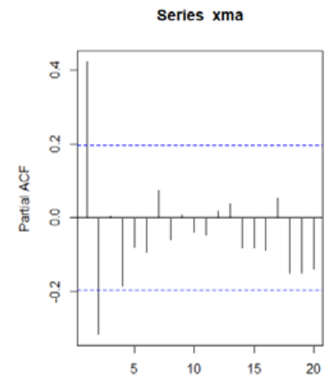
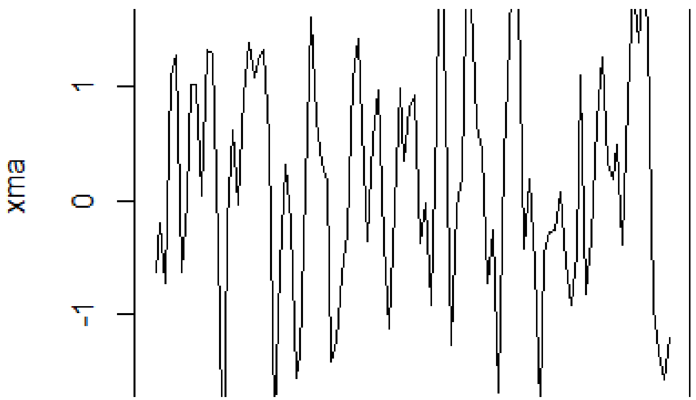
# Moving Average Process

$$Y_t = \mu + \varepsilon_t + \theta\varepsilon_{t-1}$$

- Weighted sum of most recent
- ACF – contains spikes with rest zero
- Covariance stationary
  - Mean and autocovariance are not functions of time



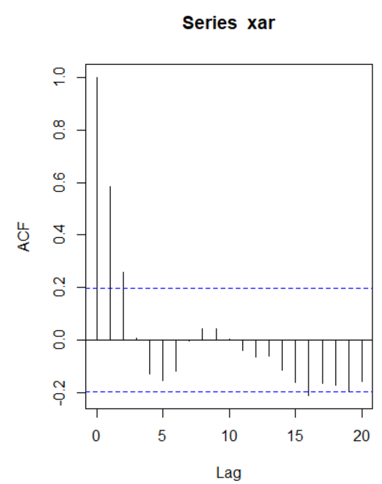



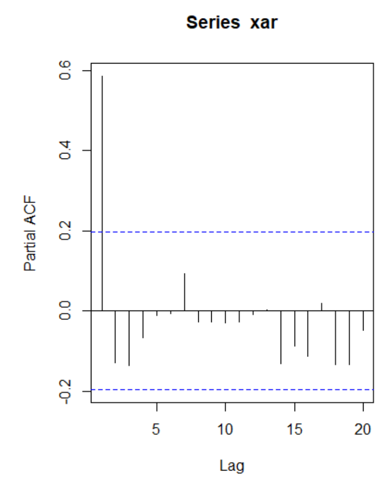



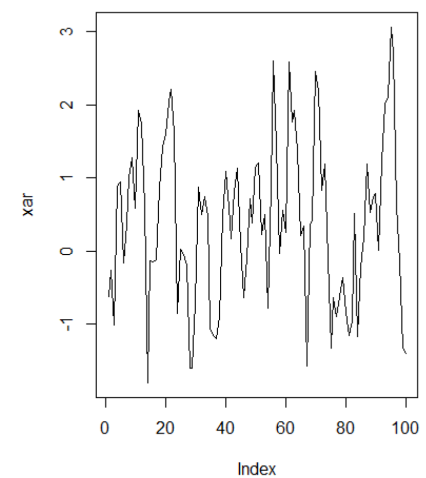
# Autoregressive Process

$$Y_t = c + \varphi Y_{t-1} + \varepsilon_t$$

- Dependent on previous values
- ACF – decay to zero
- PACF – identify order at decay
- Stationary?



# Arma/Arima

$$Y_t = c + \varphi Y_{t-1} + \varepsilon_t + \theta \varepsilon_{t-1}$$

- Mixture of AR and MA processes
- ACF – decay after lags
- PACF – identify order at decay