

# Time series

Stat 513

6-2-15

①

Usual regression model:

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

all independent

In time series, you remove the assumption of independent error terms.

Autoregressive model: Each  $y_i$  is correlated with some previous number ( $a$ ) &  $y_j$ 's

AR( $a$ )

②

Moving-average model: Each  $\varepsilon_i$  is correlated with some previous number ( $m$ ) &  $\varepsilon_j$ 's

MA( $m$ )

ARMA( $a, m$ )

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ARIMA( $a, i, m$ )

↑ integrated

↖ # of times differencing is carried out

SARIMA(s, a, i, m) (Box-Jenkins method) ③  
↑  
seasonal

These models are all based on correlations.

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Fourier approach:  
Try to express the  
curve as the sum  
of sine and cosine curves  
with different frequencies.

