


McGill University
Department of Mathematics and Statistics

**MATH 545: Introduction to Time
Series Analysis**
- Winter 2020 -

Notes by Hair Albeiro Parra Barrera
Adapted from professor Steele's lectures
April 27, 2020

img/McGill_logo.jpg

Contents

1 Introduction

2 Copy-paste templates (IGNORE)

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Definition 1 (null).

Theorem 2.1 (null).

Proposition 2.2 (ff).

Example 1 (???).

Note 1 (null).

Corollary 2.2.1 (null).

Lemma 2.3 (null).

Remark.

$$\begin{aligned}
 \mathbb{E}[(W_t(1 - W_{t-1})Z_t)(W_t(1 - W_{t-1})Z_t)] &= \mathbb{E}[(W_t(1 - W_{t-1})Z_t)^2] \\
 &= \mathbb{E}[(W_t)^2(1 - W_{t-1})^2(Z_t)^2] \\
 &= \mathbb{E}[W_t^2]\mathbb{E}[(1 - W_{t-1})^2]\mathbb{E}[Z_t^2] \\
 &= \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)(1) = \boxed{\frac{1}{4}}
 \end{aligned}$$

```

# estimate a linear trend
huron_linear <- tslm(LakeHuron ~ trend) ## Fit linear trend
huron_quad <- tslm(LakeHuron ~ trend + I(trend^2)) ## Fit quadratic trend

# Bind together the data and fitted trends
LakeHuron_with_fits <- cbind(LakeHuron,
                             Linear_trend = fitted(huron_linear),
                             Quadratic_trend = fitted(huron_quad))

# Construct the plot

```

```

autoplot(LakeHuron_with_fits) +
  ylab("Water Level (in feet)") + xlab("Year") +
  ggtitle("Lake Huron water levels (1875-1972)") +
  guides(colour= guide_legend(title = "Data series")) +
  scale_colour_manual(values=c("black","red","blue"))

```

$$\begin{array}{ccc}
 A & \xrightarrow{\phi} & B \\
 \downarrow \textcolor{red}{\eta} & & \downarrow \textcolor{red}{\psi} \\
 C & \xrightarrow{\textcolor{blue}{\eta}} & D
 \end{array}$$

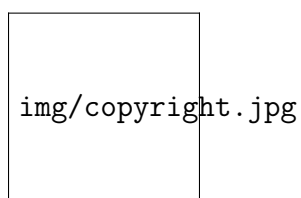
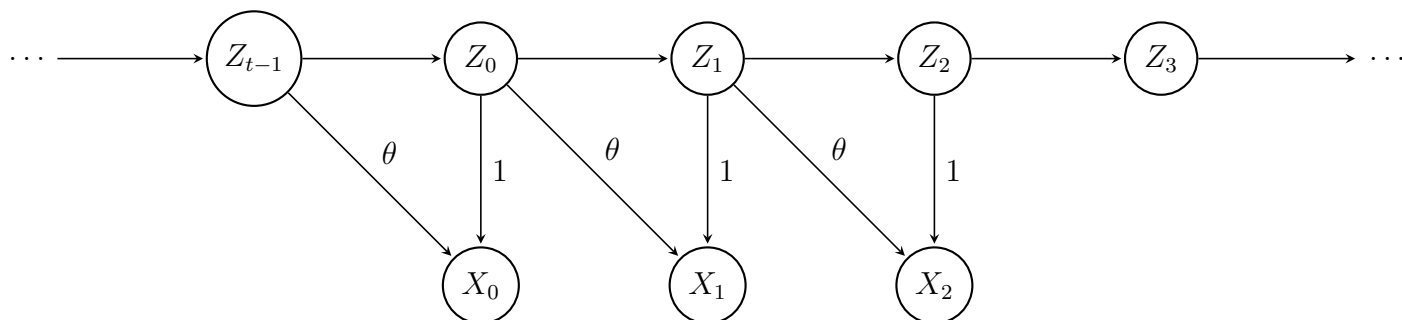
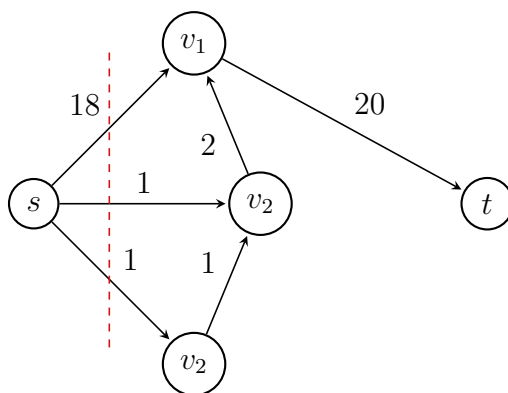
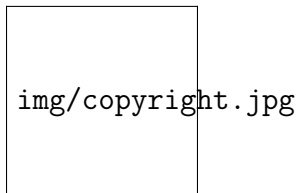


Figure 1: Copyright



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References

- [1] Rusell Steele “MATH 545: Introduction to Time Series Analysis” McGill University
Winter 2020