

Old Dominion University
Mathematics-Statistics Department
Fall 2011 Semester
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Stat 630 Homework 6

Due date: December 1st

Explain your answers.

1. Consider the model

$$X_t = \beta_0 + \beta_1 t + W_t, \quad W_t = \phi W_{t-1} + Z_t, \quad \{Z_t\} \sim WN(0, \sigma^2).$$

How would one estimate the parameters β_0 , β_1 , ϕ , and σ^2 , based on a sample (X_1, X_2, \dots, X_n) ?

2. Suppose n observations from an $AR(1)$ process U_t , i.e $U_t = \phi U_{t-1} + Z_t$ where $Z_t \sim WNN(0, \sigma^2)$.

Let $Y_t = \beta X_t + U_t$, where X_t is a set of covariates with regression coefficients β .

Get the least square estimates of β in terms of X_t and Y_t .

Hint: use ideas in Applied Regression.

3. Problem 6.1 (Use result from Problem 1.10)
4. Problem 6.5
5. Problem 6.6
6. Problem 6.7
7. Problem 6.11

Let me know if you have any questions.